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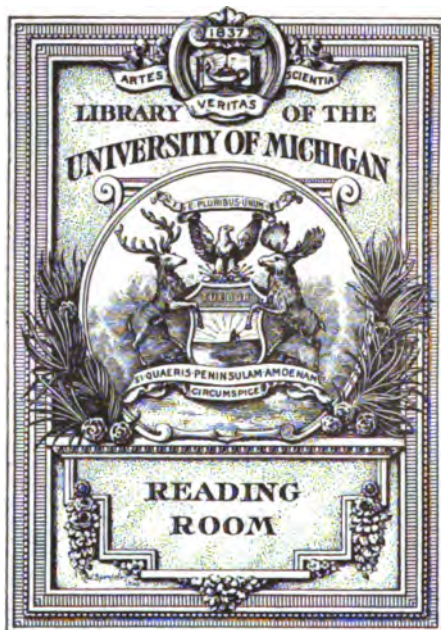
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THE  
INTERNATIONAL CYCLOPÆDIA.



# THE INTERNATIONAL CYCLOPÆDIA

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**A COMPENDIUM OF HUMAN KNOWLEDGE**

**REVISED WITH LARGE ADDITIONS**

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## MAPS IN VOL. III.

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	PAGE
BRAZIL, . . . . .	6
CALIFORNIA, . . . . .	806
CANADA, { DOMINION OF CANADA, . . . . .	866
{ MANITOBA AND NORTHWESTERN TERRITORY, . . . . .	
CENTRAL AMERICA, . . . . .	618
THE CITY OF CHICAGO (FIRST PLAN), . . . . .	764
THE CITY OF CHICAGO (SECOND PLAN), . . . . .	766
CHINA, . . . . .	784

## ILLUSTRATIONS IN VOL. III.

---

	PAGE
BRIDGES, . . . . .	46
BURIAL, ETC., . . . . .	198
BUTTERFLIES, . . . . .	230
CANNON, . . . . .	390
CARDS (COLORED), . . . . .	448
CARNIVORA, . . . . .	468
CATHEDRALS, . . . . .	548
CEREMONIES, . . . . .	628
CHEMISTRY, . . . . .	782
CHINESE EMPIRE, I., . . . . .	768
CHINESE EMPIRE, II. . . . .	790
CIRCLE, . . . . .	866





# THE INTERNATIONAL CYCLOPÆDIA.

**BRAZIL**, the largest state of South America and about equal in size to the United States, exclusive of Alaska, occupies the northeastern angle of the continent, extending from lat.  $4^{\circ} 30' \text{ N.}$  to lat.  $33^{\circ} \text{ S.}$ , and from long.  $35^{\circ}$  to long.  $73^{\circ} \text{ W.}$  Its length is estimated at 2600 miles and its extreme breadth at 2705 miles. Towards the interior it borders on all the other states of South America except Chile and Ecuador. Its coast line is nearly 4000 miles in extent, and its total area, according to official accounts, 3,288,110 square miles.

*History.*—In 1500, January 26, Vicente Yañez Pinçon, a companion of Columbus, landed at Cape Augustine, near Pernambuco, and from thence sailed northward along the coast, as far as the Orinoco. In the same year, another Portuguese commander, Pedro Alvarez Cabral, driven by adverse winds to the Brazilian coast, landed at Porto Seguro, and taking possession in the name of his monarch, named the country *Terra da Vera Cruz*. In 1501 and 1503 expeditions were sent thither under Amerigo Vespucci, who on the second voyage reached Brazil and built a fort, remaining there about five months, and then returned with a cargo of Brazil-wood, which gave the vast region its name. The Spaniards of Buenos Ayres founded Montivideo to control the Plata, but in 1509 Portugal, then at war with France, wrested from the latter more territory on the Amazon than she was to lose on the Plata. In 1581 the first permanent settlement was made by the Portuguese, on the island of S. Vincente, lat.  $24^{\circ} 30' \text{ S.}$  The hostility of the natives and the lack of means led to the abandonment of many settlements subsequently made, and a Huguenot colony, established on the bay of Rio de Janeiro in 1555, was broken up by the Portuguese in 1567, who then founded Rio, the present capital. In 1578 Brazil, as a dependency of Portugal, became a Spanish possession, but in 1630 the Dutch captured Pernambuco and held it, with other places, for twenty years. In 1654 Portugal regained Brazil, and in 1679 founded Colonia, opposite Buenos Ayres, in order to hold the eastern shore of the La Plata. This gave rise to a dispute with Spain, lasting until 1827, when the independence of Banda Oriental, as the territory was called, was recognized by Brazil. The discovery of gold toward the end of the 17th century, and of diamonds, in 1710, resulted in the rise of a number of mining towns, and in the removal of the capital from Bahia to Rio de Janeiro, but the arbitrary and exclusive colonial system under which Brazil had been settled, together with the lack of order, education, and internal communication, kept the country in a backward state. In 1807, under the pressure of French invasion, the royal family of Portugal fled to Brazil, which remained the virtual seat of government until 1821, when Dom João VI. returned, leaving his eldest son, Dom Pedro, as Prince Regent. During this period, the ports of Brazil were opened to commerce, foreign artisans were welcomed, various restrictions on domestic industries were removed, and schools, public institutions, and new courts were established, but the popular desire for free government increased; the Prince Regent, himself ambitious, willingly encouraged the movement, and directing the revolution that ensued, proclaimed the independence of Brazil, September 7, 1822, and on October 12 was crowned Emperor, as Dom Pedro I. Early in 1825 the constitution was ratified and sworn to, and in 1835 it received some amendments. The arbitrary measures of Dom Pedro made him unpopular, and in 1831 he abdicated in favor of the heir apparent, then a child, and returned to Portugal. Under the regencies which followed Brazil was vexed by disorders and political intrigues, and the reaction against republicanism ended in 1840 in the declaration of the young Prince's majority, and in his coronation in 1841, at the age of fifteen, as Dom Pedro II. (q.v.). The only wars which occurred during his reign—omitting a few insignificant revolutionary outbreaks—were in 1852 and 1865-70, the first having for its object the overthrow of the Rosas dictatorship in Buenos Ayres, and the second being the contest waged against Paraguay by Brazil, aided by Uruguay and the Argentine Republic. The centralizing system of the empire and the maladministration of the provinces gradually excited a widespread feeling of discontent, especially in the army, and the attempt in 1889 to form a *Garde Nationale* to be entirely under imperial control, hastened the crisis. On November 15

intelligence that Rio was in the hands of insurgents reached the Emperor at his country seat, and on hastening to the capitol he found that the ministry had been deposed. Later in the day a provisional government, headed by General da Fonseca (q.v.), was organized, which issued a manifesto proclaiming a republic. All these changes met with little opposition; indeed, it had been long and widely believed that the empire would not outlive the Emperor. Dom Pedro attempted to form a new ministry, but was prevented, and a new decree ordered him to leave the country with his family within twenty-four hours. The same decree continued the imperial dowry and granted the Emperor a subsidy of \$2,500,000, both of which he refused. On the following day, November 16, the Emperor and his family embarked for Portugal, and the proclamation, November 21, of universal suffrage to all Brazilians who could read and write, was followed by the appointment of a commission to draft a federal constitution. September 15, 1890, was fixed as the date for electing delegates to the constitutional assembly, and November 15 as the date for the first session of said assembly. On January 10, 1890, the separation of church and state was decreed by the provisional government. The new constitution (subject to further revision) was promulgated, June 23. In 1891, Gen. da Fonseca was elected the first president of the republic, but resigned in the same year, and was succeeded by Gen. Peixoto. In 1894, a revolt, probably aiming to restore the Empire, was headed by Admirals Da Gama and Mello and supported by the navy. Rio Janeiro was blockaded and shelled by the rebels; but largely owing to the non-recognition of the United States, whose war-vessels broke the blockade (May, 1894), the revolt collapsed, and the insurgents fled or surrendered.

**Topography.**—Extending as it does over about 80° of latitude, Brazil comprises every variety of surface, and although much of it is still unexplored, the country as a whole is known to be less mountainous than was formerly supposed, and to consist in great part of elevated plateaus from 1000 to 3000 feet in height, crossed here and there by ridges and intersected by broad valleys. The principal mountain chains, the Serra da Mantiqueira and Serra do Espinhaço, contain the sources of the São Francisco and Paraná rivers and the first-named range has one peak, called Pico do Itatiaiosé, over 8000 feet high. A nearly parallel range on the west forms the mountains of Goyaz, the highest portion of which, the Montes Pyreneos, has peaks 9000 feet high. A series of high plateaus, the Serra das Vertentes (range of the water-shed) extends westward from the Goyaz mountains nearly or quite to the Madeira river, dividing the tributaries of the Amazon from those of the Paraguay and Paraná. Of the eastern ranges, the most important is the Serra do Mar, extending from the province of Rio de Janeiro nearly to the 30th parallel, and there dividing into two branches, one of which passes westward into the Argentine Republic. The highest portion of the Serra do Mar is that known as the Organ mountains, north of the bay of Rio, whose singular peaks rise to a height of 7500 feet. The valley of the Amazon is described as a lowland plain, and the banks of that river as nowhere more than 250 feet above sea level. The greater part of the coast is sandy and low.

The Amazon (see article on that river), with its tributaries, drains fully one-half of the country, varies in width from half a mile to a mile where it enters Brazil, and is about 150 miles wide at its mouth. Its largest branch, east of the Madeira, is the Tocantins, formed by the junction of the Almas and Maranhão, which, flowing north for 900 miles, unites with the Araguaya to form the Pará branch of the Amazon. The Araguaya divides in its course into two branches, which, after flowing 220 miles reunite, forming in this manner an island called the Ilha Bananal. The Araguaya is navigable, but the other rivers east of the Madeira descend rapidly from their table-lands and few can be navigated by vessels for long distances. The streams west of the Madeira have a sluggish current and can be freely navigated for long distances. Of the northern tributaries of the Amazon the longest (1000 miles) is the Rio Negro. This is connected with the Orinoco by a natural canal called the Casiquiare. The eastern coast rivers are mostly small, but the São Francisco, a powerful stream, is 1800 miles in length, and is freely navigable by vessels for 150 miles from the Atlantic, where passage is obstructed by the Paulo Affonso falls. Its tributaries are unimportant, but one of them rises in the same lake with a branch of the Tocantins, thus making northeastern Brazil practically an island. The three branches of the La Plata system,—the Paraguay, Paraná, and Uruguay, drain, it is estimated, nearly one-fifth of the country.

The rock formation of the coast, from the province of Maranhão southward and the southeastern and southern mountains are of gneiss, which appears also along the rivers flowing northward to the Amazon and even north of the Amazon itself. Metamorphosed clay slates occur in Minas-Geraes and Matto-Grosso. The carboniferous strata are chiefly found along the coast south of Rio. Cretaceous rocks have been traced from the coast at about 18° s. northwestward as far as the Purus river, and are believed to underlie the tertiary deposits of the Amazon valley. In the province of Sergipe the cretaceous rocks are underlaid by triassic red sandstone. Tertiary clays and ferruginous sandstones overlie the cretaceous rocks of the coast plains unconformably. Drift, ascribed to the agency of glacier ice, covers the Amazon valley and southeastern and southern Brazil. True coral reefs are found along the northeastern coast. Hot wells and springs of saline or alkaline character abound.

**Mineralogy.**—Brazil is very rich in minerals and precious stones. There are coal basins of large extent; there are copper mines in the province of Rio Grande do Sul and

in Pará and Ceará; lead, iron, silver, manganese, mercury, sulphur, and saltpeter abound. Salt is extensively produced in saline marshes by the alternate processes of inundation and evaporation. Gold, accompanied with silver, is found in many of the provinces, but is especially abundant in Minas-Geraes, where the principal mines belong to English companies. Diamonds are obtained in Minas-Geraes, São Paulo, Matto Grosso, and Bahia, and the ruby, emerald, sapphire, topaz, tourmaline, amethyst, opal, and other stones are more or less common. There are valuable phosphate deposits on some of the islands, and petroleum is obtained in one or two of the provinces.

*Fauna and Flora.*—The most formidable and common beast of prey is the onça or jaguar. Besides, there are found the puma or cougar, ocelot, tiger-cat, red wolf, Brazilian dog or wild fox, wild hog, tapir, capybara or water hog, paca, three species of deer, numerous sloths, ant-eaters, armadillos, opossums, coatis, water-rats, otters, and porcupines. Rabbits, hares, and squirrels abound, and there are many species of monkeys and several kinds of bats, including the vampire. Large herds of wild horses and of half-wild oxen are seen on the southern plains. One derives some idea of the immense number of birds from Wallace's statement that he found 500 species in the Amazon valley alone, and reckoned thirty distinct species of parrots and twenty varieties of humming-birds. The largest birds are the ouira, a large eagle, the rhea or American ostrich, and the çariama (q.v.). Toucans, snowy herons, ducks, frigate birds, wild peacocks, turkeys, geese, and pigeons, are met with along the coasts or in the forests. The uraponga or bell-bird (q.v.) oriole and whippoorwill are among the smaller birds. The most venomous of the many serpents are the jararaca and the rattlesnake. The jibota or boa-constrictor and anaconda attain great length, and at least three species of cobra are noted as dangerous. Alligators, turtles, and lizards are numerous, and along the Amazon is seen the singular juruá or cowfish, an herbivorous cetacean. The rivers, lakes, and coast-waters literally swarm with fish. In the Amazon and its tributaries Agassiz found nearly 2000 species. The pira rucú, one of the largest taken in the Amazon, is a staple article of food. The piranha, a voracious fish, inhabits the São Francisco; the garoupa, a sea-fish, is of excellent flavor; the vermelho and curvina are not unlike the red-snapper of more northern waters; the dourado, a river fish, resembles the shad, and the mero, badejo, robalo, and others are highly esteemed for food. The insects include beautiful butterflies, large beetles, scorpions and spiders, bees of many kinds, musical crickets, destructive ants, the cochineal insect, sandflies and mosquitoes, and the plum, a minute fly whose bite is poisonous and sometimes dangerous.

Vegetation is of the most luxuriant description, and the forests of the Amazon valley are believed to be the most extensive in the world, producing fully 400 species of trees. The botanical families most numerous are the *Compositae*, *Leguminosae*, *Rubiaceae*, *Aroideae*, and *Filices*. In marshy places and along streams, reeds, grasses, and water plants grow in tangled masses, and in the forests trees crowd each other in the struggle for life, and are draped with parasitic vines or bound together by a network of lianas (q.v.). Along the coast mangroves, mangoes, cocoas, dwarf palms, and the Brazil-wood (q.v.) are noticeable. The southern province of Santa Catharina produces more than 40 different kinds of trees valuable for timber. Mallows and mimosas abound along the São Francisco, and among the innumerable trees of the Amazon and its affluents are the itauba or stonewood, so named from its durability, the cassia, the cinnamon-tree, the lime, the banana, the myrtle, the guava, the *bertholletia*, which yields "Brazil nuts" (q.v.), the jacaranda or rosewood (q.v.), the pao d'arco or bow-wood, the Brazilian bread-fruit, whose large seeds are used for food, the euphorbia, the copaliba, the myrtle, the macaranduba, with a bark rich in tannin and yielding a milky sap resembling india rubber, when coagulated, the large and lofty cotton-tree, the tall, white-trunked seringa or rubber-tree, which furnishes the gum of commerce, and the numerous palms (300–400 species), chief among them the carnauba palm, every part of which is useful, from the wax of its leaves to its edible pith, and the piassaba palm, the bark of which is clothed with a loose fiber used for coarse textile fabrics and for brooms. Orchidaceous plants, including several species of vanilla and showy epiden-drums, rhexias, bignonias, etc., adorn the forests, while the southern campos or prairies are covered with coarse grasses and scattered clumps of small trees or cacti. The eucalyptus and other Australian trees and shrubs have been successfully introduced. There are several kinds of nutritious native grasses which furnish grazing throughout the year. Among indigenous fruits are the pine-apple, fig, custard-apple, mango, banana, guava, and grape (v. *sycoïdes*), and orange. European grapes, olives, and watermelons of fine flavor are cultivated.

*Climate.*—This is as varied as the surface of the vast country, but is in general healthful. The Amazon valley and the coast from about lat. 20° northwards are subject to great heat, and have a winter season lasting from the end of November until the middle of May, and characterized by violent rains with thunder and lightning. At Pará, on the coast, the thermometer ranges from 98° F. to 68°. Along the Amazon showers frequently occur during the "dry season." In the inland, central provinces rainy periods occur from late October to March or April. The southeastern coast, between parallels 15° and 25°, and the valley of the São Francisco are subject to rains between October and May. In the province of São Paulo the principal rains fall between November and April. Farther south the seasons are less abruptly divided. The mean



annual temperature at the falls of the Madeira is estimated at 77°, while in the vicinity of Rio de Janeiro the thermometer ranges from 75° in January to 65° in July. The extremes are still lower in Paraná and Rio Grande do Sul. The northern coast is visited by easterly trade-winds during much of the year, the central coast by northeasterly or southeasterly winds, and the interior by southerly or northerly winds. In the mountains and on the uplands of the central and southern provinces frosts not infrequently occur in the "winter months" of June and July, and snow often falls during this period even in Paraná and Rio Grande do Sul. Brazil is exempt from the disasters produced by volcanoes and earthquakes, to which the Pacific coast is subject. Intermittent fevers prevail in the mountain valleys and marshy districts, and there are occasional epidemics of cholera and yellow fever, due largely to lack of sanitary precautions.

*Agriculture.*—Only a small portion of the surface of Brazil is under cultivation. This is in great measure due to the unfertile character of the country as a whole, large tracts being wholly unproductive or subject to long-continued droughts. Again, the agricultural population is small, as a rule, and the farms and plantations are tilled in a very slow and primitive manner, and in many parts the gathering of forest products is preferred. The profitable crops, coffee and sugar, naturally have the largest areas devoted to them; tobacco and cotton coming next. The coffee-plant is most extensively grown in the provinces of Rio de Janeiro, Minas-Geraes, and São Paulo, but can be grown in nearly every part of Brazil. The annual yield is estimated at 8,000,000 bags. Nearly all the coffee used in the United States comes from Brazil. The Atlantic provinces yield the sugar supply, especially Bahia and Pernambuco. Cotton of excellent quality is produced in every province, but Pernambuco and Maranhão are said to be best fitted for it. The average yield is two and one-half bales per acre. Tobacco, raised chiefly in Bahia, São Paulo, Pará, and Minas-Geraes, is inferior to that of the West Indies. The greater part of the tobacco exported is grown in Bahia. Maize is one of the leading products of Minas-Geraes and São Paulo, but not enough is raised for home consumption, and the same is true of rice. The small grains do not flourish. Among the more common food products are sweet potatoes, yams, beans, and the farina prepared from the root of the manioc (q. v.) or cassava. Cocoa is grown in northeastern Brazil, and the holly or ilex, which yields the maté (q. v.) or Paraguay tea, is cultivated to some extent in the extreme southern provinces, where it is indigenous. Pumpkins, squashes, cabbages, okra, tomatoes, onions, cucumbers, and other vegetables are raised.

*Industries.*—Manufactures, long occupying a subordinate place as compared with agriculture, mining, and the collecting of forest products, are becoming more important. In the provinces of Bahia and Pernambuco and elsewhere the refining of sugar is extensively carried on by the diffusion process, or in remote districts by somewhat primitive methods. Several kinds of rum are distilled in the sugar districts, and cigar-making is an important industry. In 1896 there were over one hundred and fifty cotton factories in B. The smelting of metals, the manufacture of steam-engines and agricultural tools, the tanning of leather and working of hides, and the manufacture of salt, straw hats, soap and candles employs many hands, and within recent years the list of artificial products has been lengthened by the addition of paper, calicoes, powder and dynamite, glass, wines, beer, cotton-seed oil, castor-oil, wax matches, and sulphuric acid. The raising of cattle and the breeding of horses give occupation to many in the southern province of Rio Grande do Sul. Although Brazil has so many kinds of durable woods, timber for making railroad cars is imported from India, and large quantities of salt fish are brought from the United States when Brazil might easily supply her needs by improving her own fisheries. The scarcity of coal and labor, and the unfavorable character of the mining laws operate against the production of precious metals. Ship-building is carried on at several ports.

*Commerce.*—Coffee furnishes about two-thirds of the total exports, from six to seven million bags being shipped annually, followed in importance by sugar and rubber. The principal exports to the United States, besides the articles just mentioned, are cocoa, horse-hair, wool, and hides. Other exports are cotton, tobacco, nuts, maté or Paraguay tea, dye and cabinet woods, gold-dust, diamonds, drugs and medicinal plants, tallow, horns, etc. From the United States are imported flour, cotton goods, iron and steel manufactures, petroleum, lard, soap, lumber, wooden ware, boots and shoes, etc. From Europe are obtained wines and iron, and from England the chief supply of cotton goods. Statistics for 1894 and 1895 show an extensive and increasing trade with Germany, which takes (1897) the larger part of the Brazilian tobacco crop, and buys a large quantity of coffee. The chief centers of foreign trade, and, together with São Paulo, in the interior, the principal cities, are Pará or Belem, Maranhão, Bahia, Pernambuco, and Rio de Janeiro, or Rio, the capital and the favorite halting-place of the outward-bound vessels for India, China, and Australia. In 1867 the Amazon was opened to all nations. Twenty-three steamship lines are subsidized by the government, including two from Santos to Hamburg and Genoa. Of six lines between Brazil and the United States four are British and one is German. The exports in 1895 were £36,000,000, and the imports £30,000,000. The exports to the United States in 1896 amounted to \$71,060,046: the imports from that country to \$14,258,187. Export duties are levied on domestic products. The merchant navy of B. in 1895 consisted of 189 steamers and 285 sailing vessels. By a treaty signed 1891, the United States agreed to admit Brazilian sugar, molasses, coffee and hides free of duty, and Brazil, in return, to admit free of duty a large number of agricultural products, all grains and manufactures of them, hay, pork (except hams), coal,











a large range of machinery and tools, and materials for railroad construction and equipment, besides reducing 25 per cent. the duties on many other articles. The light-houses along the coast number 59, that at the entrance to the bay of Rio being the finest.

Steam communication with Europe was opened in 1850, and telegraphic communication in 1874. The first railway was opened in 1854. In the construction of most of the railways the government has guaranteed the interest on the capital. In 1896 there were 8066 miles of railway open to traffic, and 5408 in process of construction. In 1895 there were 10,143 miles of telegraphs, with 239 offices, from which 1,283,695 messages were sent. The telegraph system of the country is under the control of the government. Brazil is connected with Europe by cable, and Pará and New York are similarly united. In 1893 there were 2826 post-offices, handling during the year 33,441,000 letters and postal cards, 37,674,000 samples and printed packets.

Almost all the circulation of Brazil is paper money. In 1892 the two chief banks of issue were consolidated as the Bank of the Republic of Brazil, and made responsible for the circulation, but the ultimate liability rests on the government. There is a mint at Rio and a domestic marine and fire insurance company. Weights and measures are those of the French metric system. The standard of value is the gold octava of 22 carats, equal to four milreis, a milreis having the value of \$1.08.

*Religion, Education, and Literature.*—Until 1890, when the separation of church and state was decreed, the Roman Catholic was the established religion, but all others were tolerated and no one could be persecuted for religious acts. The Archbishop of Bahia, the primate of the Roman Catholic church, has under him 11 suffragan bishops, 12 vicars-general, and 2000 curates. Presbyterian and other Protestant missionaries have met with some success, and Protestant colonies from Europe have established themselves, but the number of those unconnected with the ancient church is still comparatively small. Education is in a backward state, and fully 80 per cent. of the population is illiterate. The federal government controls two establishments for secondary education, united under the name of the *Gymnasio Nacional*, but the state governments are allowed to found and maintain similar institutions. Primary instruction in the states is under state or municipal control. Higher education is exclusively controlled by the central government. In 1886 the number of schools was 6224, and in 1893 they were estimated at 8000. Primary education is gratuitous, and, by the terms of the constitution, education must at every stage be under lay direction. The state college at Rio has connected with it schools of mining and engineering, an observatory, and a faculty of medicine, also (at Bahia) a faculty of medicine, and at São Paulo and Pernambuco faculties of law. At Rio, also, are institutions for the blind and the deaf and dumb, a conservatory of music, a school of agriculture, an academy of fine arts, a commercial institute, a school for technical education, and a national museum of natural history. Near the city is a military college with a school of gunnery. Academies at Rio and Rio Grande do Sul provide military training supplementing that given in the preparatory and regimental schools. There is a naval school with attached school of practical artillery and a naval college. Manáos has a botanical museum, and Pará, Ceará, and Ouro Preto, museums. A seminary for religious instruction is established in each province. The University of Coimbra, Portugal, frequently enrolls students from Brazil. The larger cities have scientific and literary associations, the oldest of which is the Historical, Geographical, and Ethnological Institute of Brazil at Rio, founded in 1838. Nearly all important places have libraries, Rio alone having no less than twenty.

The influence of the mother country upon Brazilian literature was so strong that in the strict sense there were no native authors until the present century. In the 16th century Bento Teófilo Pinto, of Pernambuco, attained distinction as a writer of poetry and prose; the 17th century produced the satirist Gregório de Mattos, of Bahia, the poets Euzébio de Mattos, brother of Gregório, and Manoel Botelho de Oliveira, the dramatist Borges de Barros, and the historians Rocha and Jabotão Pitta and Diogo Gomes Carneiro. The 18th century, more prolific, gave birth to, among others, Antonio José da Silva (1705-39) of Rio, a distinguished dramatist, who removed to Portugal where he was burnt by the Inquisition, to José Mariano da Conceição Velloso, author of the botanical work, *Flora Fluminense*, and the poets Frei José de S. Rita Durão (1719-84) author of the epic poem "Caramurú," Thomaz Gonzaga (1744-1809), and Antonio Bereira de Souza Caldas (1762-1814). Among the writers of the present century are the poets Domingos José Gonçalves de Magalhães, Viscount of Araguaia (1811-82), called the founder of the national theatre, Antonio Gonçalves Dias (1823-64), who wrote also a dictionary of the Tupi language, Aranko Porto-Alegre, Baron of Santo-Angelo (1806-79), and Casimiro José, Marquis of Abreu (1837-60), while fiction is well represented by Joaquim Manoel de Macedo (1820-82) a dramatist as well, José Martiniano de Alencar (1829-77), author of about 30 works of fiction, and Bernardo Guimarães, poet as well as novelist. There should be added the poets Alberto de Oliveira, Raymundo Corrêa, Valentim Magalhães, and Luiz Guimarães, Jr. Among historians of Brazil may be named José Maria da Silva Paranhos, Baron of Rio-Branco, and Varnhagen, Viscount of Porto-Seguro. The writers of the country have paid especial attention to fiction and poetry, and, latterly, to journalism. In pulpit oratory, and in the composition



of sacred poetry Francisco José de Carvalho (Frei Francisco de Monte-Alverne, 1785-1858) was conspicuous. The language of Brazil is Portuguese, more or less modified by dialect.

*Government.*—By the constitution of 1824 the executive power was vested in the emperor and a cabinet of 7 ministers; the legislative, in a general assembly of two houses, and the judicial in a council of state of 24 members (advisory only), a supreme tribunal, 12 district courts, and the usual subordinate courts. The crown was hereditary and irresponsible, and was vested with the rights of veto and pardon. The senate was composed of 60 life-members representing provinces, each chosen by the crown from a list of 8 members elected by the people; the chamber of deputies was composed of members representing districts and elected directly by popular vote. The right of suffrage was so restricted that the voting population barely numbered 150,000.

The constitution adopted in Feb., 1891, bases the federal system upon that of the United States. The first presidential election was by Congress, but subsequent elections have been by means of electors selected in each state by the people in proportion to their delegations in Congress. Should no citizen obtain an absolute majority of the Electoral College, then Congress shall choose one of the three persons receiving the largest number of votes. Should this measure fail, then Congress shall vote again, dropping the third name and voting for the two who have the largest number of votes, so that the president-elect shall have an absolute majority. The president is elected for four years, and shall be ineligible for the next ten years succeeding his term of office. He alone is responsible to the nation. The imperial ministers are replaced by secretaries of state, who are responsible to the president, and who are ineligible for the presidency during their terms of office. The Congress consists of a house of representatives and a senate, whose powers are purely legislative. An adverse vote by either chamber does not entail a change of ministry. A new house of representatives is elected triennially and a new senate every 9 years (one-third renewed every three years). There are 63 senators (3 for each state and federal district) and 212 deputies, according to population. The president of the senate is the vice-president of the republic. In case of the absence or death of the president, his office shall be filled by the vice-president, next by the speaker of the house of representatives, next by the vice-president of the senate, and lastly by the president of the supreme tribunal of justice. Citizens shall be unrestricted in speech, occupation, residence, religion, right to assemble in public or private, or to enter and leave the country at pleasure, and shall be equal before the law. All titles, distinctions, privileges, and decorations are abolished. New laws forbid marriage between persons of the same blood, make marriage before a civil officer obligatory, and permit divorce, but not remarriage.

The army, in 1895, comprised 4000 officers and 24,120 men, but the force could be increased in time of war. There was, in addition, a gendarmerie of 20,000 men. The navy consisted of 7 port-defence armor-clads, 1 second class battleship, 14 cruisers (1 of the first class, the others of the second and third classes), a torpedo flotilla comprising 8 first class, 6 third class torpedo boats, and small vedette boats. In accordance with a new naval programme there were several war vessels in process of construction. There are five naval arsenals.

The public debt, Dec. 31, 1895, was 1,888,475,666 milreis, of which 678,073,022 consisted of paper money issues. The foreign debt amounted to 320,918,332 milreis. The revenue for 1896, largely derived from customs duties, was 331,174,400 milreis; the expenditures, 343,436,210.

*Population.*—Agassiz describes the amalgamation of races, especially in the maritime provinces, as more widespread than in any other country in the world, the best qualities of the several races being effaced, "leaving a mongrel type deficient in physical and mental energy." About two-thirds of the population consists of mamaluços of mixed Indian and Portuguese stock, cafuzos (Indian and negro), mulattoes, and unmixed Indians and Africans. The savage Indians of the interior are generally of medium height, and are copper-colored, muscular, small-featured, and more active mentally than the Indians of North America. The Botocudos (q.v.) of the Rio Doce are among the most barbarous of the tribes, and have a different language from that used by the other Indians. Polygamy is practised by some tribes and cannibalism by the dwellers of the Purus valley. A remnant or division of the Carib nation is found in the province of Matto Grosso. The slave trade, begun early in the 18th century, was prohibited in 1831, but the importation was not prohibited till 1853, and did not cease until 1854. In 1871 a law was passed enacting that after that date all children born of slave mothers should be free, but should serve the mother's master until twenty-one years of age. The same law set apart an emancipation fund to be applied to the ransom of slaves owned by private persons. After that time emancipation made rapid progress and down to 1868 87,700 persons had been freed. In 1867 the number of slaves was 700,000, but in 1888 slavery was abolished by imperial edict.

The Brazilians as a nation are described as grave and ceremonious, but polite, quick-witted, hospitable, fond of music, and possessed of considerable sense of humor. A tendency to vindictiveness, unhappily, occasions frequent homicides among the ignorant and degraded. Love of country appears to be an active virtue. Family and social life in the cities resembles that of Europe or the United States, but in smaller places it is primitive, and women of the better classes lead a secluded and indolent existence. Aristocracy is based upon descent from the noble families of Portugal, ample fortune,

or length of time in the service of the country. The inhabitants of the southern provinces are more energetic than their fellow-countrymen in the north, doubtless owing to the more stimulating climate. Lotteries are very popular, large sums being annually invested. They are taxed by the government, and form a productive source of revenue. The budget for 1897 estimated the returns from this tax at 1,500,000 milreis. For types of aborigines, see *illus.*, PATAGONIA, Vol. XL, and for coat of arms of empire see HERALDEY, Vol. VII.

The Republic of Brazil has 20 provinces and 1 Federal District. Previous to 1872, when the first full census was taken, the estimates were based upon the official returns of 1817 and 1818. In 1880 the population was supposed to be about 7,000,000, and in 1890, 8,000,000. In the following table the figures for 1872 include about 250,000 wild Indians. Figures marked \* are based upon provincial estimates. Figures for 1890 are from the census returns of Dec. 31, 1890.

PROVINCES.	Sq. Miles.	1872.	1890.	CHIEF TOWNS.
Amazonas.....	753,469	56,610*	907,610	Manáos.
Pará.....	412,467	269,821	899,821	Pará.
Maranhão.....	141,651	368,040	459,050	S. Luis do Maranhão.
Piauí.....	81,779	202,222	202,222	Theresina.
Ceará.....	50,262	721,686*	881,686	Fortaleza.
Rio Grande do Norte.....	20,130	233,979	813,979	Natal.
Parahyba.....	20,346	382,557	382,557	Parahyba.
Pernambuco.....	46,267	841,539*	1,101,539	Pernambuco.
Alagoas.....	11,642	348,009*	648,009	Maceio.
Sergipe.....	12,038	161,307	461,307	Araçajú.
Bahia.....	204,803	1,283,141	1,683,141	Bahia.
Espirito Santo.....	17,030	82,137*	382,137	Victoria.
Rio de Janeiro.....	18,490	727,576	1,227,576	Nichteroy.
Federal District.....	540	274,972*	674,972	Rio de Janeiro.
São Paulo.....	90,541	837,354*	1,637,354	São Paulo.
Paraná.....	108,557	126,722*	626,722	Curitiba.
S. Catharina.....	18,994	159,802	259,802	Desterro.
Rio Grande do Sul.....	110,216	430,878	890,878	Porto-Alegre.
Minas-Geraes.....	237,481	2,009,023	3,009,023	Ouro Preto.
Goyaz.....	263,373	160,395*	260,395	Goyaz.
Mato Grosso.....	668,655	60,417*	170,417	Cuyabá.
Total.....	3,288,110	9,700,187	16,360,226	

The largest city, Rio, had, in 1892, a population of 522,651. Bahia had 200,000; Pernambuco, 190,000; Belem, 66,000; Ceará, 35,000; Maranhão, 38,000; São Paulo, 100,000; Porto Alegre, 55,000; Parahyba, 40,000, and Ouro Preto, 22,000.

See *Brazil and the Brazilians*, by Kidder and Fletcher (1857); *Wallace's Travels on the Amazon and Rio Negro* (1853); *Bates' The Naturalist on the River Amazon* (1863); *Keller's The Amazon and Madeira* (1874); *Agassiz's Journey in Brazil* (1868); *Scully's Brazil* (1868); *Hartt's Scientific Results of a Journey in Brazil*, by Professor Louis Agassiz (1870); *Burton's Explorations of the Highlands of Brazil* (1860); *Dent's A Year in Brazil* (1886); *Andrews' Brazil* (New York, 1887); *Climat, géologie, faune, et géographie botanique du Brésil*, by Liail (1872); *Macedo's Notions on the Chorography of Brazil* (trans., 1873); *The Empire of Brazil at the Vienna Exhibition* (Rio de Janeiro, 1873); *Gorringe's The Coast of Brazil and Trade of its Ports* (Washington, 1873); *de Almeida's Atlas do Imperio do Brazil* (Rio de Janeiro, 1868); *Le Brésil en 1889*, published by the Brazilian committee at the Paris Exposition; *O dialecto Brasileiro*, by Vasconcellos (Oporto, 1883); also the *Monthly Bulletin* and other publications of the Bureau of American Republics.

**BRAZIL**, a city and co. seat of Clay co., Ind., on the Chicago and Eastern Illinois, the Chicago and Southeastern, the Evansville and Indianapolis, and the Vandalia railroads, 57 miles w.s.w. of Indianapolis. There are many block coal mines near the place. The city has manufactures of mining engines, and machinery, railroad spikes, tile, sewer-pipe, pumps, fire-brick, and other articles; and churches, national bank, high school, public library, electric lights, and daily and weekly newspapers. Pop. 1870, 2186; 1890, 5006.

**BRAZIL**, ISLAND OF, one of the mythical islands of the Atlantic set down by early cosmographers. It was assigned to several places, and the tradition was not exploded until the publication of the British admiralty charts of 1865. See MYTHICAL ISLANDS.

**BRAZIL CABBAGE**, or CHOU CABAÏBE (*caladium sagittifolium*, or *xanthosoma sagittifolia*), a plant of the natural order *araceæ*, nearly allied to cocco (q.v.), and very similar to it, although it differs in having arrow-shaped pointed leaves. It is supposed to be originally a native of tropical America, but is now in common cultivation throughout the whole tropics; not only the root being used for food like that of cocco, but also the leaves boiled as greens. Both root and leaves are almost entirely destitute of the acridity so generally characteristic of the order.

**BRAZILIAN GRASS**, an incorrect name applied to a substance used in the manufacture of a cheap kind of hats, known as Brazilian grass hats, and also as chip hats.

It consists of stripes of the leaves of a palm, *chamarops argentea*, which are imported into Britain for this manufacture, and chiefly from Cuba. See CHAMAROPS.

**BRAZILIAN PLUM.** See HOG PLUM.

**BRAZIL NUTS** are the seeds of the *bertholletia excelsa*, a majestic and beautiful tree of the natural order *lecythidaceae* (q.v.). The tree grows to the height of 100 or 120 ft., and abounds on the banks of the Orinoco and in the northern parts of Brazil. It produces a round woody pericarp or seed-vessel, almost as large as a man's head, within which are many of the seeds or nuts. The pericarp is very heavy and solid, requiring a blow of a sledge-hammer to break it; and at the time when this great fruit is ready to fall, it is dangerous to walk under the tree. The seeds, which are popularly called nuts, and much resemble fruits of that description, are wrinkled and triangular, having a hard shell and a pure white kernel, which, when fresh, is very agreeable. They are chiefly exported from Para and French Guiana, and are well known in our shops. They yield a large quantity of oil, which is good for burning. The nuts or seeds of the *lecythia ollaria*, or POT TREE, are produced in a pericarp which resembles a rusty iron pot with a lid, the lid dropping off and letting the seeds out, which are oblong, grooved, and esteemed of a very superior quality to the common B. N.; but they have not yet become an article of commerce, as the tree grows chiefly in the interior parts of the country. See *illus.*, TREES, vol. XIV.

**BRAZIL WOOD**, a dark-red or yellowish-brown dye-wood, which forms a considerable article of export from Brazil, where some of the trees which yield it are very abundant. It is the produce of different species of *caesalpinia* (q.v.). The best kinds are those called Pernambuco wood, all saints' wood, and St. Martha wood. Much of the B. W. of commerce is obtained from *caesalpinia Brasiliensis*, a tree which is a native of the West Indies, commonly growing in dry places and among rocks, and seldom exceeding 80 ft. in height. It has bipinnate leaves, with many smooth, obtuse, oblong leaflets, and no terminal leaflets, the flowers in panicles, with downy stalks. The heart-wood alone is of any value.—PERNAMBUCO WOOD is the produce of *caesalpinia echinata*, a prickly tree, with prickly pods, and of which the red and yellow flowers have a delicious smell, resembling that of the lily of the valley. The sap-wood is extremely thick, and the valuable heart-wood bears a small proportion to the whole diameter of the stem.—The sappan wood (q.v.) of the East Indies nearly approaches B.W. in quality. It is the produce of *caesalpinia sappan*, a small thorny tree.—The BRAZILETTO WOOD, sometimes also called B. W., which is brought from the Antilles, is much inferior. *Caesalpinia crista* probably yields some of the inferior West Indian Brazil wood.—It is a curious circumstance, that B. W. is said not to take its name from Brazil, but to be mentioned under the name *Brasilia* in documents much older than the discovery of America, the sappan wood of the East Indies being probably intended; and the name of Brazil has even been supposed to be derived from that of this product of its soil.

When freshly cut, the color of B. W. is yellow; but when exposed to air, moisture, and light, it becomes red, and is generally sent into market ground down to the size of ordinary sawdust. When treated with water, alcohol, or ether, the weathered B. W. readily yields up its red coloring matter, called *Braeslein*. The latter is supposed to be produced from the oxidation of a colorless substance called *Braeslin*, which exists in the original yellow wood of the tree. Strong decoctions of B. W. are used by the dyer and calico-printer in the fabrication of reds, browns, etc.; it is also used in the manufacture of red ink. See INK.

**BRAZING**, or BRASS SOLDERING, is the process of uniting together two pieces of brass, two pieces of copper, or one of each, by means of a hard solder, partaking more or less of the composition and properties of ordinary brass. The edges or parts of metal to be joined are first filed bright, so as to be thoroughly clean, then there is strewed over the gap or crevice a mixture of the solder and borax. The solder employed varies in composition according to the kind of work, and may be rendered more fusible by the addition of a larger amount of zinc, but the general proportions are (1) 16 copper, 16 zinc, and 1 tin; (2) 12 brass, 4 zinc, and 3 tin; or (3) 18 brass, 3 zinc, and 2 tin. When the whole has been fused together, it is allowed to cool, and is then filed down to a coarse powder, in which state it is used. The borax is employed to form a glaze over the brightened surfaces, and thus prevent the oxidation of the metal, which would seriously interfere with B., and even stop the operation. An outward coating or layer of charcoal is likewise serviceable in the exclusion of the air during the B. of large pieces of metal. Where a very high heat is required in the process, a little powdered glass is mixed with the borax. The mixture of solder and borax may be applied dry, but it is better to moisten it with water, and to lay it on the filed surfaces with a spoon. The whole is then gently heated, when the water evaporates and leaves a crust of borax and solder. The work may now be strongly heated before the blow-pipe, or over a clear fire, and at a bright red heat the solder fuses, and the zinc begins to burn with a pale-blue flame. At this stage, the solder *flushes* or becomes liquid enough to permeate the joint or crevice; but should it be tardy in acting thus, several slight taps will insure the proper result. The whole is now cooled, and, towards the close, the articles may be introduced into cold water for more rapid reduction in temperature. Pieces of metal which have undergone the process of

B. are so firmly united that they may be rolled and re-rolled without the parts yielding. See **SOLDER**.

**BRAZORIA**, a co. in s.e. Texas on the Gulf of Mexico; 1440 sq. m.; pop. '90, 11,506, including colored. The International and Great Northern, the Gulf, Colorado, and Santa Fé, and the Velasco Terminal railroads intersect the county. It has a level surface of oak forests and prairie. Agriculture is the main occupation. Co. seat, Brazoria.

**BRAZOS**, a co. in s.e. Texas, on the B. river; 510 sq. m.; pop. '90, 16,650, incl. colored. The surface is undulating and fertile; chief business, agriculture. The Houston and Texas and the Gulf, Colorado, and Santa Fé railroads traverse the county. Co. seat, Bryan.

**BRAZOS DE DI'OS**, a river in the State of Texas, the second, if not the first, in magnitude that flows within the state. It runs towards the s.e., rising in the table-land of Lynn co., and falling into the gulf of Mexico about 40 m. to the s.w. of Galveston. With a course of about 900 m., it is navigable at all times to a distance of 40 m. from its mouth, and at certain seasons to a distance of 300 miles. The valley of the river, the lower half being merely an alluvial plain, presents extensive forests, interspersed with plantations of maize, sugar, and cotton.

**BRAZOS DE SANTIA'GO**, a port of entry in Cameron co., Texas, on the gulf of Mexico, 35 m. e.n.e. of Brownsville. It has some foreign and considerable coasting trade; imports in 1896, \$173,571, exports, \$297,081.

**BRAZZA**, an island in the Adriatic, belonging to Dalmatia, Austria, in lat. 43° to 44° n., and long. 16° to 17° east. It has an area of about 170 sq. m., and a pop. in 1890 of 22,650, and is separated from the mainland by a channel of some 7 or 8 m. in breadth.

**BRAZZA**, PIERRE SAVORGNAN, Count de, explorer; b. in Rome, Italy, in 1842; naturalized in France in 1879. He made his first expedition to Africa in 1875; established a commercial station on the Congo in 1879; became governor of the French Congo in 1883; and explored the principal rivers of that region, especially the Ogowé.

**BREACH**, in siege-works, is a gap in any of the defensive walls or gates of a city; and *breaching* is the operation by which the gap is produced by the guns of the besiegers. *Breaching batteries* are employed, consisting of several pieces of ordnance, so chosen as to kind and size, and so placed as to distance, as to burst a hole through the defenses in the shortest practicable time. The greatest effect is produced by lodging the balls in two vertical lines, from the parapet of the wall downwards, and in a horizontal line, connecting the lower ends of those vertical lines; and then overturning the mass of material thus loosened by an irresistible salvo or volley. When a hole has once been made, by thus knocking away the masonry or earthwork, the breaching is continued until the crumbling mass has so accumulated as to form a practicable slope, up which the storming-party of the besiegers may run. See **ASSAULT**. During the Peninsular war there were some formidable examples of breaching. At Badajoz, 14,000 shot brought down 180 ft. of wall in 104 hours, from a distance of 450 yards. At Ciudad Rodrigo, 6700 balls brought down 105 ft. of wall in 32 hours, from a distance of 560 yards. At St. Sebastian, 18,000 shot brought down 100 ft. of wall in 62 days, from a distance of 620 yards. It was calculated, from these and other instances, that 10,000 24-lb. shot, or 240,000 lbs. of iron, will breach 100 ft. of wall from a distance of 500 yards. At the siege of Fort Pulaski during the civil war (1862), it was estimated that in breaching the brick wall of the fort in two days, 110,600 pounds of metal from 36 guns struck it, giving an average of 2500 pounds to the square foot, from an average distance of 1687 yards.

**BREACH** (by derivation simply another form of the word *break*), in law, denotes any infringement or violation of a legal duty or obligation previously entered upon. The term is used more particularly with several specific phrases, which we shall consider briefly one by one: *Breach of Contract* is a phrase of very wide application; it denotes the non-fulfilment, either by commission or omission, of any agreement to do or not to do that for which a contract has been entered into by the offending party. Breaches of contract, therefore, are as varied as are conceivable contracts. Any injury not amounting to fraud for which damages may be demanded and recovered, if not *torts* (personal injuries), may be included under this head. As one writer says, "Any contract is broken by the failure of either party to do or to refrain from doing the thing which he agreed to do or not to do in the manner, time, and place in which it was agreed to be done or not done." The violation of agreements relating to the transfer or ownership of real property, or in regard to the exercise of rights connected therewith, does not, however, in legal phraseology, come under the description of breach of contract. Where one of the parties to a contract wilfully deceives the other, the wrong is *fraud*, and is distinct from mere breach of contract. Generally speaking, where no question of fraud or violation of trust is involved, a breach of contract is not criminal; if, however, there be a conspiracy among several persons to commit a breach of contract, the element of criminality will sometimes enter. The remedy for one who

has been injured by a breach of contract may consist either in the awarding of damages or the compelling of the offending party to specifically perform the act required; where there is a separate equity jurisdiction, as is the case in England and in some of our states, a demand for the specific performance of a contract must be made in the court of equity. For further consideration of this general subject see the articles on CHANCERY, COURT OF; CONTRACT; DAMAGES; EQUITY; GARNISH; OBLIGATION; SPECIFIC PERFORMANCE; and STOPPAGE IN TRANSITU. *Breach of Covenant* is defined in law phraseology as the violation of a specific covenant forming part of a deed of conveyance whereby the contracting party agrees to do or to abstain from doing some specific act connected with the conveyance.

*Breach of Close* is that form of trespass by which unlawful entry is made on land, and for which an action for damages will lie. This form of trespass was formerly called trespass *quare clausum fregit* (trespass whereby an enclosure is broken), the law supposing the existence about a man's land of an enclosure (*clausum*, or close); in other words, any entry of an illegal kind upon another's land was held as great an offense as if it were literally a breaking into a walled enclosure. Such a trespass, however slight, might be made the subject for an action of damages, and without regard to the amount of actual damage inflicted or, indeed, without regard to whether any actual damage had been done. It would be a good defense against such an action to set up and prove that it was done with the consent of the owner or in the pursuance of a legal right of any kind, such as appertains to a right of way, a right of common, or the exercise of a legal process. It makes no difference whether the trespass was actually done by the offender in person or by his agent, or even by his cattle. A Breach of Close, it has even been held, may be committed by one tenant in common against his co-tenants, or by a landlord against his own tenant. See TRESPASS.

*Breach of Duty* may be legally defined as either the non-execution of an office, or the performance of it in such a way that the conditions on which it is undertaken are violated. Such misconduct may either violate the conditions of an express contract, or it may be equally opposed and do equal violence to any implied engagement or *assumpsit*, as it is technically called in the law of England, not from the express determination of any court or the positive directions of any statute, but from natural reason and the just construction of law, which assumes and intends that every man has engaged what his duty or justice requires at his hands. And he must do this with integrity, diligence, and skill; for if, by his neglect, injury accrues to individuals, they have their remedy against him in damages. See CONTRACT, DUTY, OBLIGATION, DAMAGES, EQUITY, PERFORMANCE OF CONTRACTS.

*Breach of Privilege* is an action in violation of the privilege of a legislative body, as Parliament, the Houses of Congress or a state legislature; such a breach would be the arrest for debt of a member of Parliament, the contempt of a legislative committee by refusing to appear before it, or resistance to an officer of a legislature—a sergeant-at-arms, for instance—in the performance of his duty.

*Breach of Promise* has become almost universally restricted to the violation of a promise to marry. The contract to marry is by the law understood to be what is called an executory contract—that is, one that is to be carried out at a future time. It is, of course, one which can be entered into by any persons of legal contracting age, and a breach of the agreement may be defended by the averment that the contract was broken by mutual consent, or that discovery was made of deception on the part of the plaintiff in concealing material facts, such as another similar contract existing, or unchastity. If no such legal defense is set up for the breach of contract, a suit for damages lies, and the amount of damages demanded may be based in part on the relative wealth of the defendant, and upon the circumstances attending the case. It has been held that untruthful representations in regard to the wealth, social position, rank, profession, etc., of the plaintiff may constitute a lawful excuse for the breaking of a contract of marriage. See MARRIAGE.

*Breach of Trust* is the violation by a trustee of the obligations imposed upon him by the act or agreement laying the trust upon him. If his neglect of duty is accompanied by fraud or by gross negligence it may be punished as a criminal offense; otherwise it is a breach of duty, for which an action for damages will lie. It may be said that a breach of trust more often has in it a criminal element than an ordinary breach of contract, and the courts will scrutinize any failure to abide by the trust with great keenness, and will construe the obligations of a trust vigorously. See TRUST.

*Breach of the Peace*, any disturbance of the public order, as by an illegal tumult, a riot, or a general affray; the phrase is of more general application than a simple assault.

*Breach of Pound*, or *Pound Breach*, a misdemeanor consisting of the breaking into any pound (q.v.) and rescuing cows or cattle therein lawfully deposited and in the custody of the law. The statutes of the states which establish pounds impose specific penalties in the way of fine, and sometimes imprisonment, for such an offense.

*Breach of Arrestment*. In the Scotch law the process of arrestment answers to what is known in the law of England and the United States as either *garnishment*, or *stoppage in transitu*. Breach of arrestment is, therefore, the disregard of such a process, and it subjects the offender to an action for damages and costs, and also renders him liable to be proceeded against for contempt of court. *Breach of Duty* may be legally defined as either the non-execution of an office, or the performance of it in such a way that the conditions on which it is undertaken are violated.

**BREACH OF THE PEACE, A.** is in general any riotous behavior, or annoying conduct, such as fighting, shouting, disturbing others assembled or singly, etc. In common practice almost any conduct that can be called "disorderly" is in some sense a B. of the P. Unless occasioning some serious revolt, a B. of the P. is only a misdemeanor. See **BREACH**.

**BREACH OF TRUST.** See **TRUST**.

**BREAD.** The earliest and most primitive way of making B. was to soak the grain in water, subject it to pressure, and then dry it by natural or artificial heat. An improvement upon this, was to pound or *bray* the grain in a mortar or between two flat stones, before moistening and heating, and from this *braying* operation some etymologists propose to derive the word *bread* (as if *brayed*). A rather more elaborate bruising or grinding of the grain leads to such simple forms of bread as the *oat-cakes* of Scotland, which are prepared by moistening oat-meal (coarsely bruised oats) with water containing some common salt, kneading with the hands upon a baking-board, rolling the mass into a thin sheet, and ultimately heating before a good fire, or on an iron plate, called a *girdle*, which is suspended above the fire. In a similar manner, the barley-meal and peas-meal *bannocks* of Scotland are prepared; and in the East Indies (especially the Punjab and Afghanistan), as well as in Scotland, flour is kneaded with water, and rolled into thin sheets, as *scones*. The *passover cakes* of the Israelites were also prepared in this way. A similar preparation of wheat-flour, but where the sheet of dough is made much thicker, forms the *dampers* of Australia. The Indian corn-meal, kneaded with water and fired, affords the *corn-bread* of America. The kinds of B. referred to above are designated *unleavened*, as no leaven has been added to the dough to excite fermentation. Even in the time of Moses, however, *leaven* was employed in making bread. It is held probable that the Egyptians were the first to use leaven; that the secret afterwards became known to the Greeks; and that the Greeks communicated the process to the Romans, who spread the invention far and wide in the northern countries during their campaigns.

The grain of wheat is generally employed in the manufacture of B. among the better classes and more advanced nations, though rye, barley, Indian corn, and rice are also extensively used. The average composition of the grain of wheat when dried, so as to evaporate about 14 per cent of moisture, is—

Gluten and albumen.....	13½
Starch.....	54½
Gum, sugar, oil, and fiber.....	80
Saline matter.....	2

The proportion of these ingredients varies, however; and though the native country of wheat is unknown, yet it is found that within the wheat zone (see **WHEAT**), the quality improves as we travel south. Thus, Scotch wheat is inferior to English, the latter to French, that to the Italian; and the finest wheat in the world is grown in Barbary and Egypt. The principal constituents of wheat may be separated from each other without much difficulty. Thus, if wheat-flour be placed in a cloth-bag with the mouth well closed, and the whole introduced into a basin of water, and pressed by the fingers for some time, the starch is squeezed through the cloth as a fine white powder, and the gluten is left in the cloth as a viscid or sticky substance. Again, if wheat-flour be burned on a porcelain plate on a fire, or oven, or gas-lamp, till it can burn no longer, it leaves behind a small amount of ash or saline matter.

Previous to being employed in the fabrication of B., the grain of wheat undergoes the process of *grinding*, with the double object of reducing it to a fine state of division, and separating the more hard and indigestible parts. See **MILL**. During the grinding operations, the wheat as it passes from grain to flour nearly doubles its bulk. The products come from the dressing-machine divided into different qualities, a quarter of wheat yielding—

	Bushels.	Pecks.
Fine flour.....	5	8
Second flour.....	0	2
Fine middlings.....	0	1
Coarse middlings.....	0	0½
Bran.....	8	0
Twentypenny.....	8	0
Pollard.....	2	0
	14	2½

In the making of B. in Great Britain, the finest flour is employed in making *firsts* or the *fine 4-lb. loaf*; a coarser flour is made into *seconds* or household B.; and a still coarser into *thirds* or coarse bread. There is no bran in *firsts*, but a greater or less proportion of the finer bran in *seconds* and *thirds*. In the making of good B. three things are absolutely requisite: flour or meal, yeast or leaven, and water containing salt. The yeast (q.v.), or leaven (q.v.), is added to give a start to the fermentation (q.v.) process, thereby supplying carbonic acid, which communicates a spongy or light texture to the bread. Leaven is the more primitive ferment, and is simply a portion of moistened

flour or dough in which the putrefactive agencies have begun to work. It may be procured by allowing moistened flour to lie in a warm apartment (summer heat) for six or eight days, and when sufficiently formed, has an acid taste and reaction, and a somewhat musty odor. When brought in contact with a new portion of flour and water, and incorporated therewith by kneading, it very quickly acts as a ferment, and develops partial fermentation in the whole. Hence it is that where leaven is used, it is customary to retain a portion of the leavened dough for the next baking. On the continent, leaven is still very extensively employed, especially in districts far from breweries. In America, yeast is generally used as the ferment.

The materials being at hand, and the proper benches, utensils, and oven being within reach, the baker takes a quantity of water and adds to it the yeast and salt; after which the flour is added, and the whole thoroughly and laboriously kneaded together till it assumes aropy consistence. It is then called the *sponge*, and is placed in a kneading-trough in a warm place, which is styled *setting the sponge*. In a short time, the yeast begins to act on the gluten, starch, and sugar of the flour, compelling the latter to pass into alcohol and carbonic acid gas in every part of the dough, which thereby becomes inflated with innumerable air cavities. When the fermentation has sufficiently advanced, the baker takes the sponge, adds more flour, water, and salt, and a second time subjects the whole to a thorough process of kneading, to prevent portions being so far fermented as to become *sad*, and again allows the mass to lie in a warm place for a few hours. The dough swells considerably from distension by gas, and is weighed out into lumps of the proper size, which are shaped into loaves, constituting the *batch*, or placed in tin pans, and are allowed to lie for a short time till they get further distended. The oven has previously been heated by flues, by heated air, or by wood being burned within it, to a temperature of at least 320° F., which is the lowest temperature at which B. can be baked, and ranging up to 572° F.; and when it has been thoroughly cleaned out, the loaves are introduced and placed on the floor, and the oven shut up. The heat acts in dissipating much of the water from the dough, in distending the air cavities more fully, and in partially *boiling* the starch and gluten of the dough, and developing some gum from the starch. Indeed, though the temperature of the oven is much higher, yet the loaves beyond the mere crust are bathed in an atmosphere of steam, and are never heated above 212°, as has been proved by direct experiments with the thermometer. One effect of the heat is to arrest any further fermentation (q.v.; see also YEAST). After several hours' baking in the oven, the length of time being determined by the temperature, the loaves are withdrawn, and allowed to cool. The brown appearance of the crust of loaves, and the pleasant taste of the crusts, are due to the action of the heat on the starch and the formation of dextrine (q.v.), a sort of gum. The number of quartern (4 lb.) loaves which a sack of flour weighing 280 lbs. yields, is 90. It will be apparent, therefore, that as 280 lbs. of flour yield 360 lbs. of B., that a good deal more water must be present in the latter than in the former; and indeed, ordinary good wheaten B. contains about 45 per cent. of water. This water is retained even after the loaf is apparently dry, and even mealy, as the gum and gluten have a great affinity for water.

Improvements in the process of making B. are occasionally effected. Thus a form of yeast, called German barm or yeast (q.v.), has been introduced, which is more cleanly than ordinary yeast or leaven, but appears to be too rapid in its power of causing fermentation to be manipulated easily in the making of ordinary loaves, though it does well for pan-loaves and fancy B. in general. Ovens heated by flues are being constructed, instead of the primitive method of heating them by wood, which smokes the whole oven. Instead of raising the dough by the action of yeast, which decomposes a part of the flour and causes the loss of about 2 per cent. bicarbonate of soda and hydrochloric acid are sometimes employed. The proportion by this process are 4 lbs. of flour intimately mixed with 320 grains of bicarbonate of soda; to this is added a mixture of 800 grains of common salt in 35 ozs. of water and 6½ fluid drams of hydrochloric acid, sp.gr. 1.16, and the whole is kneaded and placed in the oven. When the mixture is made, the acid acts on the bicarbonate of soda, forming common salt, which is left in the dough, and carbonic acid is liberated at every point, and communicates a spongy texture to the dough. The disadvantage attendant on this mode of raising the dough is that it is apt to leave too much common salt in the bread. This is obviated by using water charged with carbonic acid, as described under AERATED BREAD. Sesquicarbonate of ammonia is employed to some extent in the preparation of rusks, gingerbread, and other light fancy B.; when heated, it entirely passes into gas, and thus yields a very spongy mass. *Short-bread* is prepared from flour which has been incorporated with butter. See AERATED BREAD; BAKING POWDERS.

The appearance which good wheaten B. ought to present, is that of a vesicular or spongy mass, from which layers can be readily detached; and this, known to bakers as *piled B.*, is the best index of good wholesome and easily digested bread. When the layers cannot be detached, and the loaf cannot be crumbled down by the fingers into a coarse powder, or the fragments be thoroughly soaked and be readily diffused through water, but become a permanent tough mass of dough, the B. is imperfectly made.

Rye B. is very extensively used in northern European countries, where the soil being sandy is admirably adapted for the growth of that grain. It yields a flour darker than

wheat-flour. It is almost equal in nutritive value to wheaten bread. Barley and oats, which when used as B. are generally made into cakes or bannocks, possess also a composition not unlike wheat. Indian corn, which thrives luxuriantly on the American soil, and is largely used here for B., as also to a considerable extent in the old world, is little different from wheat in the proportion of its ingredients. Rice is occasionally employed in making B., but it is not nearly so nutritious as wheat.

But although, with the exception of rice, the various kinds of grain do not sensibly differ in the amount of nutritious matter contained in the meal, yet there is a great difference as to the quality of yielding a light, spongy bread. In this respect, the flour of wheat excels all others. This quality seems to depend upon the mechanical structure of the gluten of wheat, which gives a glutinous, sticky consistency to the dough, rendering it impervious to the carbonic acid gas formed in it during the fermentation, so that the gas thus imprisoned swells it up. The meal of other grains forms a more granular and less tenacious dough, which allows the gas to escape with more or less ease as it is formed. It is thus impossible to make a light, spongy loaf of oatmeal, however finely it might be ground. In the case of whole-meal B. or brown B., the rough, hard particles of the bran interfere with the ordinary tenacious quality of wheaten-flour, and make the dough slightly porous, so that much of the gas escapes, and thus this kind of B. is never so much raised as B. of fine flour.

**BROWN, COMPOSITION, or GRAHAM BREAD** is made from the ground but undressed wheat, and therefore contains the bran as well as the flour. The whole meal (bran and fine flour) contains chemically more nutritive matter than the fine flour alone, yet the gritty particles that are present in the former cause an incessant irritation in the alimentary canal, and lead to a quicker evacuation of the but partially digested and absorbed food.

The *adulterations* of B. are various. Very commonly boiled potatoes are added to the flour and water in the making of the dough, and some consider that this yields a lighter and more palatable bread. It must be remembered, however, that the addition of any substance of a nature foreign to the composition of any material, however nourishing, is an adulteration, and that though potatoes may be supposed to improve the B., yet good B. can be made without them, and the addition of the potatoes lessens the nutritive value of the wheat-flour. Alum is occasionally added to the dough, to increase the whiteness and improve the general texture of the B.; and this it appears to do by arresting the passage of the starch into gum and sugar, which tends to take place during the process of baking. In Belgium, sulphate of copper is often used for a similar purpose. In Great Britain, B., except French rolls and fancy B., must be sold by weight only; the laws specify the requisite ingredients, and heavy penalties are imposed for adulteration. In most of the United States the statutes relating to food generally provide for punishment for the sale of adulterated articles, but are much more general than the English statutes. There are no specific enumerations of the requisite ingredients of B. There is usually appointed a public inspector and analyst, and goods suspected of adulteration must be submitted to his tests. See **NUTRITION, FOOD, BISCUIT.**

**BREADALBANE**, a mountainous district of Scotland, comprising the western part of the county of Perth. The chief proprietor is the Marquis of Breadalbane, a descendant of Sir Duncan Campbell of Lochow, created Lord Campbell in 1445. See **CAMPBELL.**

**BREAD-FRUIT TREE**, *Artocarpus incisa*, a tree of the natural order *artocarpaceae* (q. v.), a native of the islands of the Pacific ocean and of the Indian archipelago—one of the most important gifts of nature to the inhabitants of these regions, its fruit supplying the principal part of their food, and its inner bark a considerable part of their clothing, whilst its timber and its milky juice are also employed for economical purposes. The genus to which it belongs (*artocarpus*, Gr., bread-fruit) is distinguished by having the male flowers in catkins, with a 2-leaved perianth and one stamen; the female flowers naked; the fruit roundish, fleshy, and tuberculated. The bread tree is a rather slender tree, of 40 to 50 ft. high, often rising almost half its height without a branch. It has large, pinnatifid leaves, frequently 12 to 18 in. long, dark green, and glossy. The fruit is generally oval, or nearly spherical, and about the size of a child's head. It is a *scorosis*, a compound or aggregate fruit formed from numerous flowers on a common axis, and is covered with a roughish rind, which is marked with small square or lozenge-shaped divisions, having each a small elevation in the center; is at first green; when imperfectly ripened, brown; and when fully ripe, assumes a rich yellow hue. It is attached to the small branches of the tree by a short thick stalk, and hangs either singly or in clusters of two or three together. It contains a somewhat fibrous pulp, which, when ripe, becomes juicy and yellow, but has then a rotten taste. At an earlier stage; when the fruit is gathered for use, the pulp is white and mealy, and of a consistence resembling that of new bread. In a still less mature state, the fruit contains a tenacious white milk. The common practice in the South Sea islands is to cut each fruit into three or four pieces, and take out the core; then to place heated stones in the bottom of a hole dug in the earth; to cover them with green leaves, and upon this to place a layer of the fruit, then stones, leaves, and fruit alternately, till the hole is nearly filled, when leaves and earth to the depth of several inches are spread over all. In rather more than half an hour, the bread-fruit is



ready; "the outsides are, in general, nicely browned, and the inner part preserves a white or yellowish cellular pulpy substance, in appearance slightly resembling the crumb of a wheaten loaf." It has little taste, but is frequently sweetish, and more resembles the plantain than bread made of wheat-flour. It is slightly astringent, and highly nutritious. Sometimes the inhabitants of a district join to make a prodigious oven—a pit 20 or 30 ft. in circumference, the stones in which are heated by wood burned in it, and many hundred bread-fruits are thrown in, and cooked at once. Baked in this manner, bread-fruit will keep good for several weeks. Another mode of preserving it is by subjecting it in heaps to a slight degree of fermentation, and beating it into a kind of paste, which, although rather sour, is much used when fresh bread-fruit cannot be obtained. There are numerous varieties of the bread tree in the South Sea islands, and they ripen at different seasons. The tree produces two, and sometimes three, crops a year. In the West Indies and South America, into which it has also been introduced, the bread-fruit has not come much into use as an ordinary article of food; but various preparations of it are reckoned delicacies.—The fibrous inner bark of young bread-fruit trees, beaten and prepared, is used for making a kind of cloth, which is much worn by the common people in the South Sea islands, though inferior in softness and whiteness to that made from the paper mulberry (see MULBERRY, PAPER).—There exudes from the bark of the bread tree, when punctured, a thick mucilaginous fluid, which hardens by exposure to the air, and is used, when boiled with cocoa-nut oil, for making the seams of canoes, pails, etc., water-tight, and as bird-lime.—The timber is soft and light, of a rich yellow color, and assumes, when exposed to air, the appearance of mahogany. It is used for canoes, house-building, furniture, and many other purposes. It is durable when not exposed to the weather.—The JACK (q.v.) or Jaca (*A. integrifolia*), and the DEPHAL (*A. lakoocha*), both large East Indian trees, belong to the same genus with the bread-fruit tree.

**BREAD-NUT**, the fruit of *brosimum alicastrum*, a tree of the natural order *artocarpaceæ*, and therefore allied to the bread-fruit, a native of Jamaica. The genus *brosimum* is distinguished by male and female flowers on separate trees, in globose catkins, with peltate (shield-like) scales for perianth, and the fruit a one-seeded drupe. The bread-nut tree has ovate-lanceolate evergreen leaves; it abounds in a tenacious gummy milk. Its leaves and young shoots are much eaten by cattle, but deleterious qualities are developed in them as they become old. The nuts, boiled or roasted, form an agreeable article of food, and are eaten instead of bread. Their taste resembles that of hazel-nuts.—To this genus the *palo de vaca*, or Cow TREE (q.v.), of Demerara is supposed also to belong.

**BREAD-ROOM**. In the navy, the biscuits are called *bread*, and the place where they are stored is the bread-room; it is carefully constructed, warmed before being filled, and kept as much as possible free from damp.

**BREAD-ROOT**. See PSORALEA.

**BREADTH**, in art, is a term which, though often used in a very indefinite manner, is not without a definite meaning. It signifies that peculiar disposal of the background of a picture which, without sacrificing or even concealing details, gives to the whole unity and harmony of effect. With the older landscape-painters, it was a common fault to produce the effect of distance either by a certain trick of light and shadow, or by one uniform hazy color in which the individual objects were entirely lost to view, and *breadth became vacancy*. In this respect, their pictures contrast unfavorably with those of such modern painters as Turner, of whom Mr. Ruskin has very truly said that "the conception of every individual inch of distance is absolutely clear and complete in the master's mind—a separate picture fully worked out: but yet, clearly and fully as the idea is formed, just so much of it is given, and no more, as nature would have allowed us to feel or see; just so much as would enable a spectator of experience and knowledge to understand almost every minute fragment of separate detail, but appears to the unpracticed and careless eye just what a distance of nature's own would appear—an unintelligible mass. Not one line out of the millions there is without meaning, yet there is not one which is not affected and disguised by the dazzle and indecision of distance. No form is made out, and yet no form is unknown." On the subject of breadth Mr. Ruskin has, moreover, the following very judicious remarks: "It were to be wished that our writers on art would not dwell so frequently on the necessity of breadth, without explaining what it means, and that we had more constant reference made to the principle, which I can only remember having seen once clearly explained and insisted on—that breadth is not vacancy. Generalization is unity, not destruction of parts; and composition is not annihilation, but arrangement of materials. The breadth which unites the truths of nature with her harmonies is meritorious and beautiful, but the breadth which annihilates those truths by the million is not painting nature, but painting over her; and so the masses which result from right concords and relations of details are sublime and impressive, but the masses which result from the eclipse of details are contemptible and painful."

**BREAD-TREE**. See CAFFER BREAD.

**BREAKERS**, in maritime language, are the waves that break violently over rocks lying a short distance under the surface of the sea. They cover that particular part of

the sea with a foam, and produce a hoarse and often terrible roaring. "Breakers ahead" is one of the most alarming announcements made by the lookout men of a ship, seeing that the B. denote the existence of sunken rocks which may, perchance, pierce the hull of the vessel.

**BREAKING BULK**, in the Scotch law, signifies making use of an article supplied in bulk, or in quantity; by which act one is said to break bulk, and is, in consequence, prevented from afterwards objecting to it, and returning it to the seller. See **SALE OF GOODS**.

**BREAKING INCLOSURES** is an expression to be found in Scotch law-books, and means the destruction or invasion of planting and inclosures by persons or their cattle. The punishment for this offense is provided for by several old Scotch statutes, the principal of which are two passed in 1661 and 1685 respectively. The penalties are pecuniary, with right to detain the cattle found trespassing, until such penalties, along with the damage and costs, are paid. See **PLANTATION**.

**BREAKWATER** is a barrier intended for the protection of shipping in harbors or anchorages. It sometimes happens that, in front of a semicircular bay, a small island is so situated as to form a natural breakwater. This is to some extent the case with the Isle of Wight, which occupies such a position as to protect Portsmouth and Southampton from the south. In many other places, however, bays and harbors are without such screens. A pier may be so placed and constructed as to serve also the purpose of a B., but the term B. is generally confined to a structure used solely for protection, and not for berthing or traffic, and breakwaters are frequently insulated, so as to be cut off from any communication with the shore unless by water.

Plymouth B. is the best known of these engineering works. The sound or harbor, being open to the s., was so much exposed to storms that, early in the present century, it was determined to construct a B. across its mouth, with openings between it and the shore, on either side, for the ingress and egress of shipping. The works were commenced in 1812. The operations consisted in transporting along a tram-road large blocks of limestone got from a neighboring quarry, shipping them in vessels fitted with trap-doors, and by means of these depositing them in the shape of a huge mound in the required situation. As soon as the stones began to appear above water, a perceptible benefit resulted in the relative calmness of the sound during the prevalence of storms; but the structure was frequently very roughly handled by the waves, which altered and flattened its shape. A severe storm in Nov., 1824, threw a great portion of the stones over into the sound. It was not until 1841 that the works were finally completed, by the deposition of more than 3,000,000 tons of stone, and the expenditure of nearly £1,500,000. The B. is nearly a mile long, the central portion is 1000 yards; and two wings, of 850 yards each, extend from the ends of this at a slight angle. The open channels at each end, between the B. and the shore, are each about half a mile wide, and their depth is respectively 40 and 22 ft., at low water. The B. is 183 yards wide at the base, and 15 at the top—the two sides being made very sloping for the security of the stones. The slopes and top are faced with masonry. The water-space protected by this B. comprises 1120 acres, and it is generally admitted that the money has been well spent on the work.

Holyhead B. is formed of stone quarried in Holyhead mountain, drawn along a tramway on a timber structure, and cast into the sea. It more resembles a pier than the B. at Plymouth, for it is attached at one end to the shore, and is intended to convert Holyhead bay or roadstead into a harbor of refuge. The works consist of a mound of loose stones up to low water, and ashlar upright walls with a parapet above that line, with a railway on the top for trains.

Portland B. is of very great value, in converting into a harbor of refuge the expanse of water between the Dorsetshire coast and the isle, or rather peninsula of Portland. An act of parliament was obtained in 1847, authorizing the works. The B., starting from the n.e. point to the isle, stretches nearly due n. for more than 2 m., with one or two intervening openings for the ingress and egress of shipping. The works were conducted more easily than those of any other great B.; for the isle contains an abundance of stone easily quarried, and the steep shores afforded facility for transporting the stones by their own gravity to their destination. The work—which is an upright ashlar superstructure, with a parapet founded on a mound of rubble stones—was done chiefly by convict labor; the depth is about 50 ft. at low-water. From the nature of the operation, any part of the B. became useful as soon as constructed, increasing the safety of Portland bay as a harbor of refuge.

Dover B. progresses slowly, and has involved an enormous outlay. There is no stone near to form a mound, as in the other breakwaters spoken of, and, in consequence, the work requires to be brought up in solid ashlar from the bottom by the diving-bell, with the interior formed of blocks of concrete. It has never been clearly stated whether the government regards this B. as a protection to a great naval station and fortified harbor, or as a chief feature as a harbor of refuge for commercial fleets. In 1844, a commission of inquiry recommended that £2,500,000 should be laid out in forming a harbor of refuge at this place. In 40 years the work has not been finished, the great depth and frequent storms constituting terrible obstacles. The water is very deep—viz., 42 ft. at low-water; the

accumulations of shingle very troublesome, and several years must elapse before it can be made evident whether the Dover B. is worth the national money expended upon it.

Alderney B. is a great work, consisting of ashlar walls and parapet, built on a stone mound up to low-water from a depth of 72 feet.

Cherbourg B. is the greatest and the most costly ever constructed. More than 100 years ago, M. de Cessart proposed to the French government the formation of a B. at Cherbourg, to be commenced by the construction of a number of hollow cones formed of timber-framing, sunk in a line as close as they could be placed to each other, and then filled with stones. These cones, of which there were to be 64, each about 70 ft. high, 150 ft. in diameter at the base, and 60 ft. at the top, were intended to form a nucleus to the stone breakwater, to prevent the stones, during its formation, being knocked about and too much spread out by the action of the waves. In 1784 to 1788, 16 cones were constructed, and 18 of them sunk; but so great was the destruction which they underwent during stormy weather, that the government at length abandoned the plan, and carried on the stone breakwater without the aid of the cones. It was completed under Napoleon III. at a cost exceeding £2,500,000. The B. itself was finished in 1858, but since that year large fortifications have been built upon the upper works. The length is nearly 24 m.; the B. is 300 ft. wide at the bottom, and 81 at the top. The chief mass consists of rubble or unshaped stones, thrown down from ships; but there is a larger ratio of wrought and finished masonry than in the Plymouth B., consisting of granite blocks imbedded in cement. The depth of water is about 60 ft. at low-water spring-tides; and the B. rises to 12 ft. above high-water level. The water-space included within and protected by the B., is about 2000 acres, but two thirds of this has scarcely depth enough for the largest-sized ships. The relation which this B. bears to the vast military and naval arrangements of the place will be noticed under CHERBOURG.

The introduction of concrete made of Portland cement has greatly modified and simplified the construction of breakwaters. The cement is mixed with sand, gravel and broken stone in various proportions according to exposure; 1 of cement to 7 of other materials being a common proportion. Sometimes breakwaters are made by depositing large concrete rocks of 20 to 50 tons weight, in *pierres perdues* style, from the bottom up to a little above low-water, and then forming a monolithic mass of concrete above, such as the B. at St. Jean de Luz. Sometimes the concrete is lowered down inclosed in large bags; or it may be lowered down in boxes with hinged bottoms and deposited in mass on the bottom, either within timber casing, or even without any protection at all.

Many substitutes have been proposed for solid breakwaters, such as floating breakwaters constructed of timber framework, open iron screens, etc., but none of them have been shown to be suitable for actual practice. Close timber-work, filled in with stones, is found to be quite efficacious; but on most of our coasts the timber is liable to be eaten by the marine worm, which is an objection to its being used under water.

In the United States the most important work of the kind is at Lewes, Del., at the entrance of Delaware bay. A breakwater was resolved upon in 1828, and the next year the site was fixed at cape Henlopen. In 1870, the engineer reported the completion of the harbor "according to the original project devised more than 40 years ago." In the year after the completion more than 20,000 vessels visited the harbor. Its present capacity is determined by the space that is sheltered by the B. proper. This is a straight line nearly half a mile long, and may be taken as the diameter of a half circle behind it, the area of which will represent approximately the sheltered harbor. Northeast of the B. is the ice-breaker structure, a quarter of a mile in length, with an opening of about the same extent, through which the sea rolls without hindrance. It is altogether of stone, in rubble-wall and more finished work. There are several breakwaters in the northern lakes, and a very costly one at Galveston, Tex., finished in 1887.

**BRÉAL**, MICHEL JULES ALFRED, an eminent French philologist, born at Landau, in Rhenish Bavaria, March 26, 1832. He was educated at Weissenburg, Metz, and the Lycée St. Louis, where he developed a remarkable aptitude for linguistics, and finished his studies at Berlin, under Bopp and Weber. Returning to Paris he received charge of the Oriental manuscript department in the Imperial Library; and the chair of Comparative Grammar at the Sorbonne becoming vacant in 1846, obtained the appointment, but was transferred to the College of France two years later. Prof. Bréal's writings are both numerous and important; his *Étude des Origines de la Religion Zoroastrienne* received the prize of the Academy in 1862. Other important works are *De la Méthode comparative appliquée à l'étude des langues*; *Hercule et Cacus*, a study of comparative mythology; a valuable treatise on the Umbrian language, for which the Italian city of Gubbio presented him with citizenship; and *La Réforme de l'Orthographe Française* (1890). Bréal also translated into French, Bopp's great work on *Comparative Grammar*, with a learned introduction and notes. Many of his shorter writings were published in the *Revue Critique*, of which he was one of the founders and directors. In 1875, he was elected member of the Institute, and four years later appointed Inspector General of Public Instruction.

**BREAM**, a name which is apt to occasion some confusion to beginners in ichthyology, being applied equally to certain fresh-water fishes of the family *cyprinidae* (q. v.), and to certain sea-fishes of the families *sparidae* (q. v.) and *chaetodontidae* (q. v.) or *squamipennes*.

among which the resemblance is a mere general one of outward form, the first of these families belonging to the order of *malacopterous*, or soft-finned, the other two to that of *acanthopterous*, or spiny-finned fishes.

The breams of the family *cyprinidae* were included in the genus *cyprinus* (see CARP) by the older naturalists, but are readily distinguished from that genus as now defined, and from other allied genera, by their deep and compressed form, by the great convexity of both the dorsal and the abdominal outline, by the want of spiny rays in the dorsal and anal fins, by the great length of the base of the anal fin, and by the want of cirri or barbules at the mouth. They form the genus *Abramis* of Cuvier.—The COMMON B., or CARP B. (*A. brama*), is an inhabitant of many rivers and lakes of Europe, even as far as Norway and Sweden, and of some of those of Britain and Ireland. It thrives best in still waters, and in some of the Irish lakes attains a large size; it has been known to reach 12 or even 14 lbs. The tail is very broad and much forked, the head small and acuminate, the eyes very large, the scales small, the general color yellowish-brown, the cheeks and gill-covers silvery-white.—The WHITE B., or BREAMFLAT (*A. biacca*), differs from the common B. in its silvery color, the smaller number of rays in the pectoral and anal fins, and other particulars. It has never been taken of so large a size. It is found in many parts of the continent of Europe, and in some of the British lakes and rivers.—The POMERANIAN B. (*A. buggenhagus*) differs much more widely from the common B.; the body is much thicker in proportion to its depth, the scales larger, the base of the anal fin shorter, the tail less forked. This fish is known to occur in a few places of England and Ireland, and is said to abound in Pomerania.

The acanthopterous breams, or SEA BREAMS, are mostly of the family *sparidae*, and nearly allied to the gilthead (q.v.), in connection with which they may most properly be noticed. The common sea B., indeed, often receives the name of gilthead.

*Angling for Bream.*—Of the two kinds of B. known to anglers, the carp B. is much the best for sport. The flesh of the B. is not held in much estimation, though the carp B. is infinitely to be preferred of the two. B. are found in both ponds and rivers. They prefer deep, still holes, or quiet, well-sheltered eddies in the bends of rivers. Here the angler will find them in large numbers. They are rather capricious in feeding; at times they will not bite for weeks together. Being a sly, shy-biting fish, the tackle required for them must be fine. They may be captured by means of the ledger in rivers, where they should be fished for in the same way as directed for barbel, save that it will be found advisable to use another hook, which should be fastened on to the line about 8 in. or a foot above the ledger lead, as B. often take their bait some inches off the bottom. The hooks should be No. 7. In float-fishing for B. in holes or eddies, a stout swan-quill float and half a dozen No. 1 shot below it, will be found sufficient for the purpose; and, having ground-baited as directed for barbel, put on two small red worms for the angling bait, or about an inch of the tail of a bright, well-scoured lob-worm. The former is preferable. Two hooks, one to rest on the bottom, and one 6 or 8 in. off it, will be found useful, for sometimes one will be taken, and sometimes the other. The fish being tender-mouthed, should be played gently.

**BREAMING**, in nautical affairs, is a cleansing process which a ship undergoes after a voyage, or after lying for a long time in harbor. The ship's bottom, under such circumstances, often becomes covered with grass, ooze, shells, or sea-weed; and B. consists in the removal of these impurities. The ship is laid aground after the tide has ebbed, or is docked, or is careened (see CAREENING); furze and fagots are placed under it; fire is applied; the heat melts the pitch, etc., of the hull, and the pitch and filth can then be scraped and brushed off.

**BREAST**, THE FEMALE, or mammary gland, consists of a series of tubes, radiating from a common center, the nipple, which is situated in an areola or dark-colored patch. On the surface of the latter are several (from 4 to 10) sebaceous glands, which secrete an unctuous fluid to protect the skin of the nipple, which is very thin, from the saliva of the sucking infant. The milk-tubes (15 to 18 in number) enlarge into *sinuses*, and pass each to a separate lobe or subdivision of the breast, where they divide into twigs and branches (the *lactiferous ducts*), which end in minute vesicles. The lobes are held together by fibrous tissue, and are well packed in fat, which increases sometimes to an enormous extent the apparent size of the organ. It will be readily understood how over-distension of these delicate tubes, from whatever cause, must be productive of great suffering. When an abscess forms in the B., it is very dangerous to allow the matter to remain; but when an opening is made into an abscess of the B., the cut must be made in some line radiating from the nipple, so as to avoid division of the milk-tubes.

**BREASTPLATE**, in ancient armor, was a plate of iron, steel, or other metal, so fastened as to protect the chest or front of the wearer. The back-plate, in like manner, was worn to protect him from attack from behind. In modern European armies, almost the only representative of the B. is the front half of the *cuirass*, worn by the *cuirassiers* in certain foreign states, and by the household cavalry (life-guards and horse-guards) in England.

**BREAST-SUMMER**, BRESSUMER (Fr. *sommier*, a lintel), a beam supporting the whole front of a building, in the same way in which a lintel supports the portion over an

opening. They are seen in England and on the continent in old houses that are built partly of wood and partly of stone, brick, or mud.

**BREAST WHEEL.** See WATER POWER.

**BREASTWORK**, in fortification, is a hastily constructed earthwork; not so high as to need a *banquette* (q. v.) for the defenders to stand upon, but sufficient to afford shelter when they are standing on the level of the ground, and firing over the crest. The dry ditch or trench from which the earth has been taken to form the B., affords an additional defense. A B. is midway between a *parapet* and an *épaulement*, in size and importance. See *illus.*, *FORTIFICATIONS*, vol. VI.

**BREATH**, OFFENSIVE, may depend upon some cause limited to the mouth or nose, or it may arise from diseased conditions of the respiratory or digestive apparatus. If, from want of proper attention, the teeth have collected a quantity of putrescent particles around them, they must be well scrubbed with a brush and tepid water, with some powdered carbonate of magnesia mixed with it. A wash composed of a teaspoonful of tincture of myrrh in a pint of water is also very useful. Occasionally the secretion from the tonsils is very offensive; and then a solution of nitrate of silver, 4 grains to 1 ounce of water, should be applied to them every morning, with a camel-hair brush, and small alterative doses of medicine administered. Solutions of soda in water are also very useful. Should the fetid smell arise from a portion of dead bone, the latter must be removed whenever it becomes loose. Inhalations of steam from hot water into which some creasote has been dropped, is much recommended for cases in which the cause resides in the nose and respiratory passages. When, however, it is caused by digestive derangements, the treatment should consist in purging, to empty the intestinal canal, followed by soda, to correct acidity, and tonics, of which the bitter infusions and tinctures, and the dilute mineral acids, are among the best.

All medical treatment is unavailing to correct the foul odor which rises from the stomach of the habitual drunkard, or from the victim of gangrene or abscess in the lungs.

**BREATH AND BREATHING.** See RESPIRATION.

**BREATH FIGURES.** See COHESION FIGURES.

**BREATHITT**, a co. in e. Kentucky; 450 sq. m.: pop. '70, 5652—181 colored; in '90, 8705. The co. is hilly, with forests, and has iron and coal; but the main productions are agricultural. Co. seat, Jackson.

**BREBEUF**, JEAN DE, b. France, 1598; killed in the Huron country in 1649; a Jesuit missionary who came with Champlain in 1626. His labors were mainly among the Hurons, with whose life and language he became very familiar. When the town of St. Louis was taken by the Iroquois, B. and Lalemont, his associate, were made prisoners and tortured to death. It is said that B.'s head is preserved in the pediment of a silver bust in the convent of the hospital nuns in Quebec. Some of his writings on the Huron language are preserved, and were translated by Albert Gallatin.

**BRECCIA**, a term adopted from the Italian to designate a mass composed of angular fragments of rocks of the same or more different kinds, cemented together by an enveloping paste, or by infiltrated iron or carbonate of lime.

**BRECHE-DE-ROLAND**, a defile of the Pyrenees, between France and Spain, about 11 m. s. of St. Jean de Luz, with an elevation of about 9500 ft. above the sea. It is a difficult passage of from 200 to 800 ft. in width, between precipitous rocks rising to a height of from 800 to 600 feet.

**BRE'CHIN**, a t. of Forfarshire, on the left bank of the South Esk, 8 m. w. of its junction with the sea at Montrose. Pop. '91, 8955. It unites with Montrose, Arbroath, Forfar, and Bervie in returning one member to parliament. Spinning, bleaching, distilling, and brewing are carried on here, as also the manufacture of linens and sailcloth. B. was once a walled town. David I. founded a cathedral and bishopric here in the 12th century. Part of the cathedral, built chiefly in the 13th, 14th, and 15th centuries, is now the parish church. Close to the church is a round tower of a Culdee college, similar to the Irish ones and to the one at Abernethy, the only other example in Scotland. The tower is 87 ft. high, 25 ft. in diameter at the base, and 12½ ft. at the top, and it is surmounted by a 15th c. spire of 25 feet. It dates from about the year 983. B. castle, the ancient seat of the Maules (now of their representative, the earl of Dalhousie) was taken by Edward I. in 1303, after a siege of 20 days. B. was burned by Montrose in 1645.

**BRECK**, JAMES LLOYD, 1818-76; b. Philadelphia; educator. He was educated under the Rev. Dr. Muhlenberg, and at the General Theological Seminary; joined a mission for work among the Indians on the western frontier in 1841; and spent the remainder of his life in organizing and conducting Protestant Episcopal schools.

**BRECKENRIDGE**, a co. in n.w. Kentucky, on the Ohio river, 502 sq. m.; pop. '90, 18,976; undulating surface, well watered and fertile. There are some curious sink-holes and caves in the co.; and there are various medicinal springs. Chief productions, agricultural. Co. seat, Hardinsburg.

**BRECKENRIDGE, JOHN, D.D., 1797-1841;** b. Ky.; a Presbyterian minister, graduate of Princeton college. In 1822 he was licensed to preach, and soon afterwards served as chaplain in congress. His first church was in Lexington, Ky., where he established a newspaper, *The Western Luminary*. In 1831 he removed to Philadelphia and was secretary and general agent of the Presbyterian board of education; subsequently professor in Princeton theological seminary; and in 1838 secretary and general agent of the board of foreign missions. He resigned in 1840, and just before his death was chosen president of Oglethorpe university, in Georgia.

**BRECKENRIDGE, JOHN CABELL, b. Ky., 1821;** studied law in Transylvanian university, and settled at Lexington. He was a member of congress from his state for several terms; and in 1856 was elected vice-president. In 1860 he was nominated for president by the extreme southern section of the Democratic national convention, but, with Douglas and Bell, was defeated by Lincoln. He was immediately chosen U. S. senator, but abandoned his seat and went with the secessionists, when he entered the army and became a maj.gen. In 1865, just before the collapse of the rebellion, he was appointed confederate secretary of war. At the close of the conflict he went to Europe, where he remained several years. He died in 1876.

**BRECKENRIDGE, ROBERT JEFFERSON, D.D., brother of Rev. John, 1900-71;** b. Ky.; at first a lawyer and member of the legislature; but in 1829 he joined the Presbyterian church, and in 1832 became pastor of the first Presbyterian church in Baltimore, where he officiated for 13 years. In 1845, he became president of Jefferson college; two years later removed to Kentucky and became state superintendent of public instruction. In 1853, he was professor of theology in Danville seminary. Dr. B. was a strong old-school leader in the great division of the Presbyterian church. In the slavery discussions he was extreme on neither side, and when the civil war began he was for the union, but he was much opposed to the emancipation proclamation. In 1864, he was president of the convention that nominated Lincoln for a second term. Dr. B. is credited with being the principal author of the common school system of Kentucky. Among his works are *Internal Evidences of Christianity*; *Papism in the United States*; and some books of travel.

**BRECKNOCKSHIRE, or BRE'CON, an inland co. of South Wales, to the s. of Radnor,** from which it is separated by the Wye. Length, about 85 m.; average breadth, 20. Area, 734 sq.m., of which two thirds are cultivated. B. is one of the most mountainous counties in South Wales, and has deep, beautiful, and fertile valleys. Two principal mountain-chains, the highest in South Wales, rising with Brecknock peaks to a height of 2863 ft., intersect the county in the n. and s., and occupy, with their offshoots, a great part of the surface. Old red sandstone occupies the s. and middle of the co., and silurian rocks the north. The chief rivers are the Wye, Usk, Yrffon, Elan, Claerwen, and Tawe. The climate is severe and rainy but healthy among the mountains, and in the valleys comparatively mild. The agriculture, though still defective, especially in the higher districts, was greatly improved by the Brecknockshire agricultural society, instituted in 1755. The chief crops are oats and barley, but much wheat is also grown in Talgarth and Crickhowell, the most fertile districts of the county. In the valleys in the e. some hops are raised, and some orchards are seen. The native small black-cattle are reared in the hills, while in the lowlands the Hereford breed predominates. The mineral produce is small, consisting of iron, especially along the s. border; coal and limestone are found in the south and west. Lead ore is also mined, and slate is found at Crom Yrffon. The Brecon canal connects the co. with the Bristol channel, and many railways have been constructed throughout the county. There are several important iron-works, but the ore is chiefly obtained from adjoining counties. B. returns one member to parliament. Pop. in 1891, 51,393. The chief towns are Brecon, the co. and only corporate one, Builth, Crickhowell, Hay, and Llanelli. There are many remains of British and Roman camps, Roman roads, cairns, cromlechs, mounds, and castles throughout the county. B. formed part of the territory of the Silures, who bravely withstood the Romans. The Normans, under Barnard Newmarch, wrested the co. from the Welsh princes in 1092. Llewelyn, the last British prince of Wales, was killed in this co. in 1282, and by his fall the native mountain-chiefs were entirely subdued. Half the people in B. still speak Welsh.

**BRECON, BRECKNOCK, or ABERHONDDU, the capital of Brecknockshire, South Wales, is situated in an open valley in the middle of the co., at the confluence of the Usk, Honddu, and Tarell, 171 m. w.n.w. of London.** It lies in the midst of fine mountain scenery, and has beautiful public walks. South of B. lie the three mountain-peaks, the Brecon beacons. Pop. '91, 5600. It returns one member to parliament. There is a considerable trade in lime, which abounds in the neighborhood. Barnard Newmarch, a relative of William the conqueror, founded the town, and built a castle here in 1094. He also founded two priories here in the reign of Henry I. Henry VIII. turned one of the priories into a college, still existing; the other is now the parish church. B. was formerly surrounded by a wall, having ten towers and five gates. Hugh Price, founder of Jesus college, Oxford, and Mrs. Siddons, the celebrated actress, were natives of Brecon.

**BREDA, a t. of North Brabant, Holland, situated at the confluence of the navigable rivers Merk and Aa, and containing (Jan. 1, 1896) 24,651 inhabitants.** It formerly pos-

sessed the means of laying the surrounding country under water in the event of an attack, but the importance of the town, as a military position, has passed away, and in 1876 the fortifications were removed. It has a Gothic cathedral, with a lofty tower and several interesting monuments; also an old castle built in 1350, which was for some time the residence of Charles II. of England, and is now a military academy. There are manufactures of carpets, linen, hats, soap, leather, etc., and dye-works, breweries, and rope-walks. It is celebrated as the place where, in 1566, the protest of the Dutch nobles, known as the "compromise of Breda," against the measures of Philip II. of Spain in the Netherlands, was presented and rejected. During the subsequent centuries, it was the scene of much conflict and diplomatizing until 1813, when the French were finally driven out.

**BREDA, DECLARATION** of, the manifesto of Charles II. sent from Breda (1660) previous to his restoration and designed to remove the apprehension felt by many as to the consequences of his accession to the throne. Among its provisions was a free and general pardon to all his subjects, saving only such as should be excepted by parliament. It further promised a settlement of forfeited estates, liquidation of arrears to the army, and that no man should be disturbed for religious opinions not prejudicial to the peace of the kingdom.

**BREDA, JAN VAN**, 1683-1750; a Dutch painter. He imitated Wouvermans and Breughel so cleverly that connoisseurs are often unable to detect the copy.

**BREDEBO'DE, HENDRIK VAN**, Count, 1531-68; one of the sovereign counts of Holland, and a leader against Spanish domination in that country. He was for many years turbulent, active, and a source of annoyance about as much to his own party as to the other. After the complete success of the Spaniards he asked Egmont to intercede for him with the regent; his followers were dispersed, some were put to death, and he himself died in a few months.

**BREDOW, GABRIEL GOTTFRIED**, 1773-1814; a German historian and professor in the university of Breslau. English readers know his *Manual of Ancient History; Researches on History, Geography, and Chronology*, and *Historical Fables*.

**BREË, MATTHEUS IGNAZIUS VAN**, an excellent Flemish painter, b. at Antwerp 23d Feb., 1773, and educated partly there, and partly under Vincent in Paris. As early as 1798, he attracted attention by his "Death of Cato," and several other excellent pictures soon followed. A peculiar talent for rapid and vivid sketching enabled B. to execute for Napoleon, in a few hours, "The Maneuvering of the Fleet before Antwerp on the Scheldt," and, with equal celerity, Napoleon's "Entrance into Amsterdam, at the Moment when the Magistrate presents him with the Keys of the City." In 1816, he painted the famous Leyden burgomaster, Van der Werff, in the act of addressing the famished and murmuring populace during the siege of 1576: "Take my body, and share it among you." This great work—now in the town-house of Leyden—is marked by a felicitous arrangement of the figures, and by a bold and lively coloring, after the style of Rubens. Other celebrated pictures of B.'s are: "Count Egmont receiving Spiritual Consolation before his Execution," "Rubens dictating his Dying Testament," "The Tomb of Nero at Rome, with a Group of Lazzaroni and Musicians." B. died 15th Dec., 1839. In the latter part of his life, he was director of the academy of fine arts at Antwerp.

**BREË, PHILIPP JACOB VAN**, brother of the preceding, 1786-1840, also acquired some reputation as an historical painter. The Belgian government bought his "Interior of St. Peter's, Rome," and gave him a gold medal.

**BREECH**, of a gun, is the end furthest from the muzzle. For details, see BREECH-LOADING ARMS; MACHINE GUNS; ORDNANCE; ORDNANCE FABRICATION; RAPID-FIRE GUNS; REVOLVER.

**BREECHES BIBLE**. See BIBLE.

**BREECHING**, of a naval gun or carronade, is a strong rope by which the recoil of the gun is checked at such a point that the muzzle is brought wholly within the port-hole, where the seamen can sponge and reload it.

**BREECH-LOADING**, in artillery, relates to a mode of constructing large pieces of ordnance, and small-arms or hand-firearms, the peculiar manner of charging which the term describes. This subject will be found fully treated in the article ORDNANCE.

**BREECH-LOADING ARMS** have been tried, accepted and abandoned without number during the last three centuries, although it is only within the last forty years that the system has been carried out with success. The extraordinary efficacy of breech-loading arms was brought prominently forward during the wars of the past few years, and notably in the Prussian campaigns against Denmark in 1864, and against Austria in 1866. Breech-loading guns began to appear in the first half of the 16th century, and were probably either of French or German origin. During the War of Independence a breech-loading rifle invented by Major Patrick Fergusson, and known as the Fergusson rifle, was used, and it was the first breech-loading carbine used in the British regular army. The introduction of this type of weapon into this country dates properly from 1865, after which muzzle-loading arms were no longer manufactured at the Springfield armory. A short time before the civil war the government tested a number of breech-loading guns, such as the Burnside, Cosmopolitan, Gallagher, Joslyn, Merrill,

Maynard, Smith, Linder, and Sharp. During the war the Spencer rifle was much used by the U. S. Cavalry; it has a magazine in the butt of the stock holding 7 cartridges. The well known Remington is a single breech-loader, and was adopted by the U. S. navy, Egypt, Spain, and several other countries. Army boards composed of U. S. army officers have repeatedly declared in favor of the Springfield single-loader, and in spite of everything to the contrary, that arm is still in use in our army, although a board in 1892 recommended the adoption of a modification of the Krag-Jørgensen type of rifle. Although the idea of and desire for breech-loading is a very old one it was never satisfactorily applied in small arms till metallic-cased ammunition came into use, because the making of the breech sufficiently gas-tight was difficult before there were cartridge-cases to act as gas-checks. The Chassepot and the far-famed needle-gun, with those above mentioned, did good service, but good breech-loaders did not exist before gas-checking cartridge cases. The metallic-cased, self-primed, gas-checking cartridge of to-day should properly be credited to Napoleon I. He encouraged and aided an artillery officer named Pauly to experiment, till, in 1812, a cartridge was produced having nearly all the essential features of the modern one. For almost a quarter of a century the hammer and anvil have been busy throughout the civilized world in making the weapons of death more deadly. Each nation has, as a rule, elaborated a system from among its own inventors, or if another system has been adopted, it has been subjected to various changes and modifications and stamped more or less with the individuality of the nation adopting it. Nations possessing no great reserve of arms have prepared an entirely new armament; but those having well stocked arsenals were for years content with altering the old types into breech-loaders. The weapons that have passed out of use will barely be mentioned in the following descriptions, which will be confined to what has taken place within the past five or six years. The development has been so rapid, and so many systems have been in use for a short while and then abandoned, that an extended description of them can hardly be considered necessary.

The question of calibre, which is one of the unsettled questions of the day, although all are agreed upon a reduction below the U. S. standard of .45, was prominently brought forward by Professor Hebler, a German artillery scientist, in 1886, in which he explains the advantages of his system of rifling and those of the smallest practicable calibre. He claims a much flatter trajectory and thereby a much longer shot-swept space, less recoil, lighter ammunition, greater accuracy, greater penetration, less deviation by lateral effect of the wind, and that the wound produced is sufficient to cripple, while much more humane. He scientifically considers all features of rifling, twist, depth, and breadth of grooves and lands, the ammunition and the pressure of gases, and demonstrates, both mathematically and experimentally, that the most efficient rifle is one having a calibre of 7.53 millimetres, a uniform twist of one turn in 15½ calibres, and 6 grooves and lands concentric with the axis of the bore. The Hebler cartridge consists of a bullet made of lead and a compressed gunpowder cartridge. The reduction of the recoil is also proved to be less than with the Mauser, Gras, and Martini-Henry systems. Some of the special features of this system are apparent in all of the more modern patterns that have appeared since it was made public. The *Mannlicher* of the type used by Austria was originally designed to use cartridges of black powder, the charges of which are greater in bulk than corresponding charges of smokeless powder. In order to use the latter, the entire piece would have to be altered; but to avoid the great expense of so doing, the Austrian military authorities have decided to retain the same size of cartridge case by adding to the charge of smokeless powder a sufficient quantity of some neutral material to bring up its bulk to that of the black powder charge. A necessary change will be that of the sights, which must be graduated for the new powder. The increase of the pressure along the bore when using smokeless powder will necessitate stronger barrels than are now used in this gun, as many of them have burst from the effects of the higher pressure. The *MANNLICHER* type of arms has been adopted by Austria, Chili, and Bulgaria—Germany has also received it with modifications that will be explained later on. It is a bolt gun weighing 9.68 pounds, has a calibre of .315 inch, 4 trough-shaped grooves .0078 inch deep and .138 inch wide. The sight is graduated to 2,700 yards. The barrel is of Bessemer steel, bronzed externally. The bolt-handle draws to the rear until the cock-notch passes the trigger catch, which movement withdraws the firing pin, compresses the firing spring, and carries the brace-quoin to the rear. A projection on the brace slides up an incline in the brace-quoin raising the brace until it is clear of the recoil-shoulder, and freeing the bolt for withdrawal as far as the stop will permit. The stop which limits the withdrawal of the bolt is located on the left of the casing, and retains the bolt of the locking spring. A projection on the stop extends through the receiver and engages in the bolt. The extractor is pivoted near the middle of the bolt. The fore end is shaped like a claw, which takes over the cartridge-rim; the rear end carries a projection which fits into a recess in the brace-quoin. As the brace-quoin is drawn to the rear this projection passes out of its recess, and thereby forces the claw at the fore end to grip the cartridge-rim. On shoving the bolt to the front the cock-notch remains in rear of the trigger-catch, while the brace-quoin, continuing its movement, forces the brace-quoin down into place against the recoil-shoulder, and the projection at the rear end of the extractor, resuming its socket in the brace-quoin, locks this latter against accidental dislocation. The piece, being cocked and ready for dis-



charge, may be locked by means of a locking-bolt, which is operated by means of a locking-sector on the left of the breech. In the locking position, the locking-bolt projects in front of the cock-notch, which would be prevented from moving to the front if accidentally released by the trigger. The magazine-pocket is a light steel frame, containing five rounds, arranged horizontally, with their base-rims lying in the vertical groove at the rear end of the packet. The packet is dropped from above into the magazine, where it is held between the packet-catch and the *carrière*-plate which bears only against the bottom round. The *carrière*-plate moves up between the sides of the packet as the rounds are expended, and when the last has been fed, its upward pressure on the packet will cease, and the packet will be ejected downward by the action of the packet-catch. The bullet weighs 248 grains; its core is lead, hardened with 5 per cent. of antimony and pressed into a steel envelope .131 inch thick. Experiments are in progress with material composed of 80 parts of copper and 20 parts of nickel. This will cost much more than the steel envelope, but will not corrode and will not strip the rifling, which is thought to be the reason for the projected change. The powder charge weighed 61.7 grains (the exact weight of the newer powder will not be known until further experiments have been made). Each magazine-pocket contains five rounds weighing 385 grains, and twenty packets are supplied each man, making the weight of ammunition carried per man 7.08 pounds. In competitions in Belgium with the Mannlicher, Nagant, Peiper, and Schulof rifles, the Mannlicher proved itself an excellent weapon, being durable and simple, and easily defeated its competitors. Twenty shots per minute were easily fired, and the magazine-pocket, containing five rounds, required but a very short time to adjust.

Germany, in 1886, re-armed her infantry with a rifle, calibre .43, converted from the *Mauver* breech-loading rifle that succeeded the needle-gun and had been in use since 1871. The barrel is made of mild cast steel, cylindrical, slightly diminishing in thickness at the muzzle, and had an octagonal shape in rear of the rear sight, while that portion forward of the rear sight is smooth and round. The muzzle-sight is a hardened steel knife-edge, sloping toward the muzzle, and is pushed into the notch of the sight-mass sideways. The rear sight consists of two hinged sight-bars secured to the sight-mass by a movable pin, the small bar in rear and long bar in front. Both bars are brought into vertical position for use by pressure of the finger, the small bar being held in position by a special spring in the right eyelet, and the long bar by a special spring set in the foot of the sight. When the long bar is down the standing sight is in position and it is used for distances less than 270 metres. The small bar serves for 350 metres; the long bar for distances of 400 to 1000 metres. The sights are kept dark-dull to avoid any errors in the aim by deceptive sight. The rear end of the barrel is closed by the breech-bolt. The bore is divided into two parts, the rifled portion and the cartridge chamber. The rifling consists of four grooves and four lands of equal breadth. The twist is from left to right, and makes one turn in 50 calibres. The lands are beveled, sloping toward the chamber, to permit the cartridges to take the rifling with facility. The chamber is in the octagonal part of the barrel; its walls are smooth and very strong. When empty it weighs 4.6 kilograms; when loaded, 5 kilograms (11 pounds). The firing-pin is screwed into the breech-plug and goes through the bolt with its forward pointed end projecting through the bolt head-piece. The spiral firing-pin is coiled around the pin in the bolt proper. The bolt's guide-vail has a shoulder which fits into the abutment in the case and prevents the bolt from falling out of the case when drawn back and open. By loosening the screw the bolt may be drawn over. The breech is closed by the head-piece of the bolt, which is free to revolve in the recess in the front end of the bolt; it is bored to admit the firing-pin. The safety-piece prevents the gun from being fired accidentally. This fits into the guide-vail of the breech-plug and is free to revolve, when turned to the right it engages a notch in the plug, so that the breech-plug cannot fly forward even if the trigger be pulled. The extractor fits on the head-piece and has a claw by which it draws the empty cartridge-case out of the chamber as the bolt moves to the rear. The repeater loading mechanism consists of the cartridge magazine, the pawl with double spring, the spoon or *carrière*, and the cut-off. The magazine is a tube of thin sheet steel placed in a hole bored in the wooden stock. Its rear end opens into the case and its front end has a cover to which a stick is attached to enable arms to be stacked. It contains 8 cartridges and a spiral spring with a disc on the rear end; the spring presses the cartridges toward the opening into the case. The pawl prevents the admission of a second cartridge, or of the disc on the end of the spring, into the spoon. The pawl is secured to the left side of the bottom of the case and projects with its claw through to the opening of the magazine tube. The spoon or carrier is a hinged block with a hollow surface to fit the cartridges; it is secured to the case so that its front end may rise and fall. The cut-off or regulating mechanism serves to adjust the gun for a repeater or single loader. The Mannlicher that has been adopted for use in Germany has no wooden guard for the hand; but instead, the barrel is enveloped in a metallic case which absorbs heat very slowly and forms a protection, not only to the hand, but also to the barrel, preserving the latter from the wear and tear of rough usage in service. The sights are secured to this envelope. The front sight is a knife-edge set vertically in a sight-mass. The rear sight consists of a hinged flap and a sliding bar, and is graduated to 2,050 metres. In aiming,

the bottom of the notch in the sliding-bar is intended to be brought in line with the knife-edge of the front sight. The magazine-box is fixed. The magazine charger is a light tin frame containing five rimless cartridges lying one above another, with a groove—which is cut in near the base of each—taking in vertical projections at the rear end of the charger, and with the horizontal edges of the charger curved in to hold the cartridges in place. The charger is introduced and pushed down from above until a projection on its rear face takes under a catch. As the cartridges are discharged a carrier plate moves up between the sides of the charger until the last cartridge enters the chamber, when the empty charger, having nothing to sustain it, drops down and out. To lock the piece, a small vertical lip on top of the rear of the bolt is moved to the right, to a horizontal position, when, even though the trigger be pulled, the firing-pin cannot touch the cartridge. The bullet is of lead encased in German silver. Each soldier carries two cartridge-boxes in front containing 12 charges of 5 cartridges each, and one cartridge-box behind, containing 18 charges of 5 cartridges each, a total of 150 cartridges, which, with their accompanying chargers, weigh 10½ pounds. The calibre is .311 inch; length without bayonet, 4.08 feet; weight without bayonet, 8.88 lbs.; weight of charge, 38.6 grains; weight of bullet, 223.7 grains. Number of grooves, 4; length, 28.35 inches; twist, one turn in 9.45 inches. Average rate of fire per minute, 18; penetration in dry fir wood at 1 mile, 2 inches.

The SCHMIDT magazine rifle has been officially adopted in Switzerland. Its calibre is .295 inch; weight of smokeless powder charge, 40.8 grains; weight of bullet, 221.3 grains; muzzle velocity, 2,862 feet per second; estimated rate of fire, 30 shots per minute. It is a bolt-gun in which a to-and-fro movement of the bolt suffices to extract the empty cartridge-case, introduce a new cartridge from the magazine, and make ready for use, in consequence of which the soldier is enabled to fire continuously without removing the piece from his shoulder so long as there are cartridges in the magazine. By means of a cut-off the gun can be used either as a magazine-arm or as a single loader. The magazine is fixed, and differs from the Mannlicher type in being closed at the bottom. It is fitted to contain 12 cartridges placed to partly ride each other, and is filled from the top, being so arranged that it can either be fully charged at once or have its cartridges entered one by one. The bullet is of lead, enclosed in an envelope of nickel-steel. A wooden guard is fitted to the barrel between the sights, and the gun is sighted up to 2,624 yards. Each soldier using this arm is to carry 8 chargers of 6 cartridges each in a box; 16 chargers of 6 cartridges each in a haversack, and 20 loose cartridges in a pouch—a total of 164 cartridges.

Denmark has adopted the KRAG-JØRGENSEN rifle, of .315 calibre; the magazine is a horizontal fixed box under the breech-casing which curves up to the cartridge opening on the left side of the gun. This magazine is constructed to contain five cartridges, which are to be loaded into it from tin chargers. A cut-off in the rear of the magazine permits the use of the gun as a single loader. The barrel is encased in a metal envelope very similar to that of the new German rifle. The gun weighs 9.4 pounds, has 6 grooves, and a twist of one turn in 11.8 inches.

France has replaced the Gras by the LEBEL rifle, which is composed of six principal parts, namely, the barrel, bolt, repeating mechanism, stock in two pieces, fittings and sword bayonet. The barrel has two parts, the barrel proper and the receiver. The barrel, of tempered steel, is bronzed exteriorly. There are four grooves, turning from right to left. Each land is half the groove-width. The receiver which screws on the rear end of the barrel contains in its upper part the lodgment for the bolt, and in its lower part the lodgment for the repeating mechanism. The bolt consists of eight pieces and the repeating mechanism of six. The fore-arm contains the magazine, with a capacity for eight cartridges arranged longitudinally. Length of rifle without bayonet, 51.4 inches; calibre, min. .314; max. .323; depth of grooves, .0059 inch; weight without bayonet, and magazine empty, 9.196 pounds; weight of eight cartridges, .517 pound. Sighted for 2187 yds. The bullet is hardened lead coated with nickel, length 1.181 in. weight 231.5 grains; at 220 yards can pierce 15 inches of oak. The powder is a compound of gun-cotton and collodion producing little smoke and noise and a very slight recoil. On raising the bolt-lever the spiral side of the cocking-groove acts on the spiral side of the quoin and tends to turn the cocking-piece, which takes a retrograde movement. When the bolt-lever is vertical the front face of the cocking-piece has passed the rear and the piece is cocked. The bolt is now pulled to the rear until the lower tenon of the movable head fetches up against the projection on the carrier-lever. The cartridge-case is drawn to the rear; its left side takes against the screw-ejector; its right side is held by the claw of the extractor, consequently it pivots about the screw-ejector, and is projected out of the receiver. On shoving the bolt to the front the cartridge is pushed into the chamber by the movable head and the extractor. The bolt-lever is now turned down to the right. The tail of the carrier-lever, owing to the pressure of the lower reinforce of the cylinder, descends, lowering the carrier. The heel of the carrier bears on the long arm of the cartridge-retention lever, and consequently raises the short arm and the lip. The second cartridge, being no longer withheld by the beak of the carrier, shoots into the chamber under the pressure of the magazine spring, and the rim of the third cartridge is intercepted by the lip of the retention lever. The Lebel bullet passes through the bone when it strikes full, and produces fracture only when the impact is tangential.

The CARCANO magazine rifle is supplied to the army in Italy. It has a bore of .256 inch and carries a magazine containing 6 rounds. Its length is 50.7 inches; weight, 8.4 pounds; weight of cartridge, 188 grains. The bullet is of lead with a covering of copper, and it has a muzzle velocity of 2,320 ft. per second. The Snider and Martini-Henry rifles in England have finally given way to a combination of the Lee and Männlicher, having .303 calibre. The magazine is a sheet-steel box which is inserted through an opening in the body from underneath in front of the trigger-guard, and held in place by a spring engaging in a notch in the magazine. It is secured to the gun by a few links of steel chain. A cut-off is fitted to the right side of the body, which, when pressed in, cuts off the further supply of cartridges from the magazine, and permits the gun to be used as a single-loader. The magazine can be freed from the gun by pressing a lever inside the trigger-guard. The cartridges, eight in number, are packed in the magazine, half riding one another, and rest on a movable platform which is pressed up by a spring which feeds the cartridges to the chamber. The breech action is on the bolt system, and the cocking piece is so arranged that the gun can be carried at half-cock. A solid rib of steel takes the recoil on the right of the bolt and a solid steel lug on the left. The firing-pin and its spring are in the heart of the bolt, which, when forced home, holds back the pin and compresses the spring. If the bolt is not pushed close home the pulling of the trigger will completely close it before firing. A safety catch on the left side, if pulled back when the piece is at full cock, locks the mechanism. There is a gas-escape on each side of the breech and one in the bolt-head. Removable covers are fitted to the bolt and bolt-head, and a wooden hand-guard is fitted over the rear end of the barrel to protect the hand when the barrel gets heated. Two sets of sights are furnished, one for ordinary sighting, graduated to 1900 yards, and the other for long distance, up to 3500 yards. For ranges up to 1900 yards the fore sight is a rectangular block with a narrow slit down the middle. The rear sight is a hinged flap with a sliding-bar having its upper edge beveled with a square notch cut in the middle, from the centre of which a fine white line runs vertically downward. For long distance sighting both sights are on the left of the gun. The rear sight is simply a disc containing a circular aperture. The front sight is a dial graduated from 1800 to 3500 yards and has a revolving index hand which, when set at the distance required, is brought in line with the aperture of the rear sight. Length of piece, 49.5 inches; weight complete, 9.13 pounds; weight of bullet, 215 grains; charge of powder, 65 grains; number of grooves, 7. The bullet is of lead, encased in a nickel or steel envelope.

No important change since 1895 has been made by any of the powers in the small arms of their troops. Rifles of small caliber have now been adopted all over the world. The U. S. army has been entirely supplied with the new Krag-Jörgenson gun of .30 caliber, and the navy with Lee rifles of .236 caliber. The following table gives the rifles of the principal countries of the world.

COUNTRY.	Name of Gun.	Calibre.	Length, without Bayonet.	Length, with Bayonet.	Weight, without Bayonet.	Weight, with Bayonet.	No. of Cartridges in Magazine.	Guns Sighted to —	Covering or Jacket of Cartridge.	Weight of Whole Cartridge.	Muzzle Velocity, Ft., Seconds.
Canada.....	Martini-Metford..	.303	49	65	9.7	11.2	1	1,900	Nickel.....	287	1,850
U. S. Army....	Krag-Jörgenson...	.30	49.10	60.85	9.4	10.4	5	2,200	Nickel.....	264	2,000
U. S. Navy....	Lee.....	.236	.....	.....	.....	.....	.....	.....	Nickel.....	168	2,400
Mexico.....	Mondragon.....	.256	48.9	.....	8.12	8.25	8	2,603	White Metal.	193	2,362
Columbia.....	Mausser.....	.301	48.6	66.7	8.6	9.9	5	2,187	Mallieschort.	252	2,120
Argentina.....	Mausser.....	.301	48.6	66.7	8.6	9.9	5	2,187	Mallieschort.	250	2,120
Brazil.....	Männlicher.....	.296	49.1	68.11	9.4	10.4	5	.....	Steel.....	253	.....
Chile.....	Männlicher.....	.315	50.4	60	9.7	10.5	5	2,406	Steel.....	276	2,060
Peru.....	Männlicher.....	.315	50.4	60	9.7	10.5	5	2,406	Steel.....	286.5	2,065
Austria.....	Männlicher.....	.315	50.4	62.3	9.9	10.8	5	3,000	Maille.....	286	2,115
Belgium.....	Mausser.....	.301	50.2	60.04	8.6	9.5	5	2,190	Maille.....	269	1,968
Denmark.....	Krag-Jörgenson...	.315	52.3	62.8	9.5	10.04	5	2,078	Maille.....	270	1,950
England.....	Lee-Metford.....	.303	49.5	61.7	9.2	10.19	10	2,900	Nickel.....	245	2,200
France.....	Lebel.....	.315	51.4	72.8	9.2	10.10	8	2,187	Nickel.....	274	2,190
Germany.....	Mausser.....	.311	48.8	57.6	8.4	9.2	5	2,330	Nickel.....	269	2,035
Greece.....	Gras.....	.433	51.1	72	9.2	10.5	1	1,968	Paper.....	471	1,411
Holland.....	Männlicher.....	.256	50.3	60.7	9.9	10.7	5	1,968	Nickel.....	191	2,300
Italy.....	Carcano.....	.256	50.7	62.6	8.4	9.17	6	2,077	Copper.....	188	2,320
Norway.....	Krag-Jörgenson...	.256	50.6	62.1	8.8	9.3	5	2,406	Nickel.....	.....	.....
Portugal.....	Kropatschek.....	.315	51.7	70.4	10.2	11.4	8	2,406	Copper.....	280	1,984
Roumania.....	Männlicher.....	.256	48	57.9	8.4	9.2	5	2,096	Nickel.....	198	2,427
Russia.....	Mousin.....	.30	50.7	68.1	8.8	9.4	5	2,096	Nickel.....	248	2,034
Spain.....	Mausser.....	.276	50.1	60	8.6	9.7	5	.....	Maille.....	282	2,285
Servia.....	Koka.....	.284	51.2	64.3	.....	.....	6	.....	Steel.....	270	.....
Sweden.....	Remington.....	.315	49.01	68.1	8.8	10.3	1	2,100	Copper.....	276	2,004
Switzerland..	Schmidt-Rübín..	.296	51.2	62.9	9.4	10.4	12	1,750	Steel.....	242	1,969
Turkey.....	Mausser.....	.301	48.6	66.7	8.6	9.9	5	2,187	Lead.....	253	2,067
Hawaii.....	Springfield.....	.45	51.9	69.8	9.3	10.05	1	2,000	Lead.....	570	1,315
Japan.....	Murata.....	.315	48	59	9.0	9.6	8	2,800	Copper.....	274	1,850

**BREED**, in domestic animals, a variety or often merely a race distinguished by the possession of particular qualities, but not differing from the ordinary type of the species so as to constitute what naturalists usually designate a variety. The peculiarities of breeds in animals find an exact counterpart in cultivated plants, the value of particular kinds often depending, in a great measure, upon characters scarcely capable of being defined in the language of scientific description, but to the production and perpetuation of which

the attention of the cultivator cannot be too earnestly directed. These, also, in plants, as in animals, have of themselves little permanence, and the preservation or perpetuation of them depends upon the same assiduous attention and high cultivation from which, more frequently than from any mere accidental circumstances, they have originated. Thus it happens that the most improved varieties of garden-plants usually degenerate even under ordinary horticultural treatment, and the choice pansies of the florist lose their characteristic excellences if a place is simply assigned to them in a common flower-border. The improvements which cultivation has effected in the productions of the fruit, flower, and kitchen garden do not, however, possess an economic importance to be compared to that of the similar improvements in the cereals and other plants cultivated on the most extensive scale, or in the breeds of some of the most valuable domestic animals. To the breeding of these, great attention has of late been paid—probably more since the beginning of the 19th c. than in all the previous history of the world—and with results the magnitude of which may in some measure be estimated from the statement made on very competent authority, that within the last thirty years the weight of mutton produced has been about doubled in proportion to the number of sheep kept. To the improvement of the B. of horses, attention has been paid for a much longer time than to that of oxen and sheep; and to this must, in a great measure, be ascribed the different excellences of some of the well-known breeds employed for very different purposes. The use of the horse in war, and for purposes of pomp and luxury, appears to have been the reason of the higher degree of attention thus paid to it, even from ancient times. The Arabs have long been particularly careful of the B. of their horses, and diligently preserve a record of their pedigree. What is called *blood* in horses, however, only fits them in a higher degree for certain purposes; and with regard to this as to other animals, the judgment of the breeder must be exercised, as the perpetuation, increase, or combination of particular qualities may be the object which he has in view. Fleetness and strength are important qualities in horses, the extremes of which never co-exist in the same animal, but of which a certain combination is for some purposes very desirable; and either of these may be displayed in a great degree without much *bottom*, or power of enduring continued severe exertion—a quality of very high value. The properties most desired in sheep and oxen are very different from those most highly esteemed in the horse—the fleece and the flesh being chiefly regarded in sheep, the flesh and the milk in oxen. Sometimes a perpetuation of good qualities is the great object of the breeder, and a combination of them in the highest possible degree is aimed at; sometimes, the production of the largest possible quantity of beef or mutton in the shortest time being almost exclusively designed, the breeder neglects considerations which would be of importance if his stock could not be improved by animals obtained from other quarters. Extraordinary differences are certainly found to exist among animals of the same species in the readiness with which they convert food into flesh and fat, and in the age at which they are fit for the hands of the butcher. One effect of the attention bestowed of late upon the breeding of stock, has been to supply the market, to a great extent, with the flesh of younger animals than could previously be sent to it—a change evidently tending not only to the benefit of the farmer, but to increase national wealth.

Some of the most important breeds of domestic animals will be mentioned under their proper heads. It remains for us only to allude here to the rules and physiological principles of breeding; but the latter, in so far as application of them has yet been found practicable, are only the best known principles of physiology (q.v.). In a great measure, however, the rules which guide the breeding of stock have been learned by experience, and are rather to be regarded as contributions to science than as deductions from it. The probable relative influence of the male and female parent upon their progeny, is a point unquestionably of the greatest importance, but concerning which widely different opinions have been maintained; and another much controverted and important point is, the propriety of *breeding in and in*. Practically, the rule is always observed, by those who seek the improvement of a *breed*, of selecting the very finest animals possible, both male and female; although a great improvement of the existing stock on a farm is often effected in the most advantageous manner by the mere introduction of males of better quality. The dangers of breeding *in and in* are very generally acknowledged, even whilst it is contended that they may very much be obviated by careful rejection of every faulty animal, and that in this way the utmost advantage may be taken of the very highest improvements; but it is likewise very generally admitted that, if equally improved individuals can be obtained not so nearly related, it is better to seek the perpetuation of the B. by their means. It is a rule also of much practical importance, that an improvement of B. is to be attained not by a *cross* between animals of very different breeds, as between a dray-horse and a race-horse, but only between those which are comparatively similar. The result of the intermixture of very dissimilar breeds is never in any respect satisfactory.

**BREDE**, a river in Cape Colony, flowing chiefly through the district of Zwellendam, which contains cape Agulhas, the most southerly point of Africa. It rises in the Warm-Bokkeveld, a mountain-basin about lat. 33° 10' s., and long. 19° 30' e., running first to the w., and afterwards to the s.e.; and it enters St. Sebastian's Bay or Port Beaufort, from which, upwards, it is navigable to a distance of 40 miles. Its exports are wool, aloes, skins, feathers, grain, butter, cattle, mules, etc.

**BREKESE**, SYDNEY, born in New York in 1800, removed to Ill., 1821. He held important legal offices in Ill., and published a vol. of Supreme court reports, 1829. He served as lieut. col. of vols. in the Black Hawk war; was elected to the Supreme court, 1841; U. S. senator, 1843-49. He was one of the originators of the Ill. Central railroad. After years of service as speaker of the Ill. house of representatives, and in the circuit judgeship, he was elected justice of the Supreme court, holding the office till his death in 1878—being for several terms chief justice.

**BREEZE**. See WIND.

**BRE'GENZ**, a frontier t. of Austria, capital of the district of Vorarlberg, is situated at the mouth of the small river Bregenz, which here flows into the lake of Constance, between the Swiss and Bavarian territories, about 80 m. w.n.w. of Innsprück. From the ruins of the castle of Hohenbregenz, on a hill near the town, a very beautiful prospect is obtained of the lake and its surrounding vineyards, etc. B. is one of the oldest towns, and was formerly one of the chief fortified places in the southern part of Germany. The inhabitants (1890), 6789 in number, are engaged in agriculture, horticulture, and cattle-keeping. Cotton-spinning and weaving are also carried on.

**BREGUET**, ABRAHAM LOUIS, 1747-1823; a Swiss mechanician and watchmaker, and a native of Neuchâtel. The astronomical and nautical instruments invented by him were noted for the perfection of their workmanship, and his improvements in watches were of decided value, and included the use of rubies in pivot holes. He was made a member of the Academy of Sciences at Paris, and of the French Bureau of Longitude. A grandson, LOUIS, 1808-83, also a watchmaker, published in 1845 a treatise on the electric telegraph.

**BRE'HON LAWS** (in Irish, *dlighidh breitheamhuin*—that is, "judges' laws"), the name usually given to the system of jurisprudence which prevailed among the native Irish from an early period till towards the middle of the 17th century. The *breitheamhuin* (pronounced *brei-hoo-in*, or *brehon*), from whom the laws had their name, were hereditary judges, who administered justice among the members of their tribe, seated in the open air, upon a few sods, on a hill or rising ground. The poet Spenser, in his *View of the State of Ireland*, written in 1596, describes the B. L. as "a rule of right unwritten, but delivered by tradition from one to another, in which oftentimes there appeareth great share of equity, in determining the right between party and party, but in many things repugning quite both to God's law and man's: as, for example, in the case of murder, the brehon—that is, their judge—will compound between the murderer and the friends of the party murdered, which prosecute the action, that the malefactor shall give unto them, or to the child or wife of him that is slain, a recompense, which they call an *erio*; by which vile law of theirs many murders amongst them are made up and smothered: and this judge being, as he is called, the lord's brehon, adjudgeth for the most part a better share unto his lord, that is, the lord of the soil, or head of the sept, and also, unto himself for his judgment, a greater portion than unto the plaintiffs or parties grieved." Spenser was ignorant that pecuniary compensation for manslaughter had obtained in the ancient laws, as well of England as of most European nations. He was mistaken, too, in believing that the B. L. was an unwritten code. Many manuscript collections of the B. L. still exist in public and private libraries in Ireland, England, and Belgium. These manuscripts are regarded as varying in date from the early part of the 14th to the close of the 16th century. For the laws themselves, a much higher antiquity is claimed. On this point, we must be content to quote what has been said on the part of the very few persons who have had an opportunity of making themselves acquainted with the existing collections of the brehon laws. "So far as we have external evidence to guide us," say Dr. J. H. Todd and Dr. C. Graves, two eminent Irish antiquaries, "there is no reason to suspect that the brehon laws have undergone any material change since the time of Cormac Mac Cuilleannain, king and bishop of Cashel, who died 908 A.D. He was a man of great learning and energy, who certainly promoted the execution of considerable literary works, and under whose influence it is not improbable that a systematic compilation of the laws may have been effected. Of this, however, we have no distinct record. On the other hand, we find scattered through all parts of the laws allusions to a general revision of them made in the 5th c., at the instance of St. Patrick, who, in conjunction with certain kings and learned men, is said to have expunged from them all those institutions which savored of paganism, and to have framed the code called the *Seanchus Mor*. These same documents assert the existence of still more ancient written laws, the greater part of which are ascribed to Cormac Mac Art, monarch of Ireland, in the middle of the 8d century. However slow we may be to acquiesce in statements of this kind, which contradict what we have learned concerning the progress of legislation in the remaining parts of western Europe, we may readily admit that the subject matter of many of the laws demonstrates their great antiquity, as it indicates the primitive nature of the society in which they prevailed. In spite of the attempts to efface it, traces of heathenism are still discernible in many parts of them.

**BREISACH**, ALT, a very old t. of the grand duchy of Baden, situated on an isolated basalt hill on the right side of the Rhine, about 12 m. w. of Freiburg. As early as the time of Julius Caesar, *Mons Brisiacus* was known as a strong military position, and was

taken by Ariovistus when he invaded Gaul. Being regarded as the key to the w. of Germany, it was a prominent scene of action during the thirty years' war, at the conclusion of which it was ceded to the French. During the next century, it frequently changed masters, now belonging to France, and now to Austria. The French destroyed its fortifications in 1744, and during the war of the revolution in 1793, part of the town was burned by them. In 1806, the French handed it over to the house of Baden. The minister of St. Stephen is a venerable structure in good preservation, and contains several old monuments. Pop. '90, about 4000.

**BREISGAU**, a German district which in the middle ages extended along the right bank of the Rhine, from the episcopal territory of Strasbourg to Basel, embracing Freiburg and the southern Black Forest. Since 1810 it has been part of Baden.

**BREISLAK**, SCIPIONE, 1748-1826; b. in Rome; geologist. He was professor in the Collegio Nazareno, in Rome, and devoted his leisure to geological researches in the papal states. The king of Naples appointed him professor of mineralogy to the royal artillery, and under his direction the sulphur refining works in the district of Solfatara were erected. In 1798 he published his *Physical Topography of the Campagna*, and followed with various works on similar topics.

**BREITENFELD**, a village and manor of Saxony, about 5 m. n. of Leipsic. It is historically remarkable for three battles, fought on a plain in its neighborhood. The first of these, between the Swedes and the Imperialists, which was fought on the 7th Sept., 1631, was of the highest importance to Europe, as it secured the permanency of Protestantism and the freedom of Germany. Tilly's pride had reached its highest point after the fall of Magdeburg, which took place on the 10th of May, 1631; and in the early part of Sept. of the same year, he advanced against the Saxons, with an army of about 40,000 men, for the purpose of forcing the elector, John George I. (who would not submit to the edict of restitution, and was treating with the Swedish king, Gustavus Adolphus), into an alliance with the emperor. No other way remained than for the elector to join the Swedish king, who had just entered Pomerania. Gustavus Adolphus, joined by the Saxons, advanced towards Leipsic, where Tilly lay, who advanced into the plain of Breitenfeld. The imperial forces were completely defeated, and their three most distinguished generals, Tilly, Pappenheim, and Fürstenberg, wounded. The second battle which B. witnessed again resulted in the triumph of Swedish valor: it took place on the 23d of Oct., 1642, between the Swedes, headed by Torstenson, one of the pupils of Gustavus, who had invested Leipsic, and the archduke Leopold, with Gen. Piccolomini, who were advancing from Dresden to its relief. The Swedes gained a complete victory over the imperialists, who fled into Bohemia, leaving behind them 46 cannon, 121 flags, 69 standards, and the whole of their baggage. The third battle of which B. was the scene, was fought on the 16th of Oct., 1818, and was part of the great contest known as the battle of Leipsic.

**BREITMANN**, HANS. See LELAND, CHARLES GODFREY.

**BREMEN**, a state and free city of Germany, is situated on the Weser, about 50 m. from its mouth. Pop. '95, 196,404, nearly all Protestants. B. is divided into the old and the new town—the former on the right, the latter on the left side of the river, which is spanned by four bridges. The ramparts and bastions round the old town have been leveled, and formed into public promenades, which are laid out with excellent taste. Among the principal buildings, the cathedral (built about 1160), the Gothic town-hall (begun about 1406), with its famous wine-cellar, said to contain hock of the vintage of 1624, the exchange, the museum, the post office, and the observatory of Dr. Olbers, from which he discovered the planets Pallas and Vesta, are remarkable. The position of B. makes it the emporium of Brunswick, Hesse, and other countries through which the Weser flows. Besides its excellent water communication, it is connected by railways with the whole of western and central Germany. B. is an exceedingly thriving place. Large vessels stop at Bremerhaven, where there is a spacious harbor constructed, about 38 m. below B., with which it is connected by electric telegraph. Vessels not drawing more than 7 ft. of water can come up to the town itself. Altogether there are four harbors, including the "Safety," or original harbor. The city leased the entire harbor district to a private corporation. B. carries on an extensive commerce with European countries, the United States of America, the West Indies, Africa, the East Indies, China, and Australia. This commerce has shown a remarkable development since 1847, rising from 197,000,000 marks in that year to 1,276,000,000 in 1891, and it has since increased. With the exception of Hamburg, no continental port ships so many emigrants to the United States as B., through its main port at Bremerhaven. The number of ships belonging to the state in 1895 was 423, with an aggregate burden of 422,205 tons, including 206 steamers with an aggregate burden of 224,206 tons. In 1895, the value of the imports amounted to 806,301,101 marks; exports, 785,852,249, a very great increase as compared with the year 1858, when the imports were valued at \$41,185,000, and the exports at about \$40,000,000. The chief imports are tobacco, coffee, sugar, cotton, rice, skins, dye-woods, wines, timber, hemp, etc. The exports consist of woolen goods, linens, glass, rags, wool, hemp, hides, oil-cake, wooden toys, etc. Large quantities of tobacco are re-exported. B. has manufactures of woolens and cottons, cigars, paper, and starch, and extensive shipbuilding yards, breweries, distilleries, and

sugar refineries. The cigar and sugar manufactures have of late declined, the former on account of the increase of duty. It has steam communication with New York, and Hull, Havana, the n. coast of South America, etc., by vessels of the North German-Lloyd steamship company.

B. first became of historical note in the 8th c., when it was erected into a bishopric by Charlemagne. It soon attained considerable commercial importance, and became one of the principal cities of the Hanseatic league (q.v.). Having frequently suffered at the hands of the French, it was, in 1810, incorporated with that empire; but it recovered its independence in 1813, and by the congress of Vienna was admitted, in 1815, as one of the Hanse towns, into the Germanic confederation. In 1867, it became a member of the North German confederation, and now it forms part of the German empire. In 1884 it agreed to a surrender of its privileges as a free port, which took effect Oct. 1, 1886, but certain new docks and warehouses (the *Freihafen Gebiet*), as well as the Bremerhaven docks, are excepted from this arrangement. The area of its territory is about 100 sq. m. The government is intrusted to a senate of 16 members, two of whom are chosen burgo-masters, and to a municipal council of 150 burgesses.

BREMERHAVEN, a port on the Weser, about 10 m. from its mouth, was founded by Bremen in 1827, on ground acquired from Hanover.

BREMER, a co. in n.e. Iowa, on Cedar river; 432 sq. m.; pop. '70, 14,528; '90, 14,630; good soil, well watered and timbered; traversed by the Illinois Central, the Burlington, Cedar Rapids, and Northern, and the Chicago and Great Western railroads. Agricultural productions. Co. seat, Waverly.

BREMER, FREDRIKA, a Swedish novelist, was b. in Tuorla, near Abo, in Finland, 17th Aug., 1801; but when she was only three years old, her father removed to Sweden. As a child of eight, she had already begun to write verses; and the works of German poets, Schiller more especially, exercised a most powerful influence over her youthful imagination. Her original novels first made their appearance under the general title *Tekningar ur Hvardagslivet*, at Stockholm, in 1835. It was not, however, till 1842 that the English public hailed with delight the appearance, in an English dress, of *The Neighbors*, perhaps the most universally popular of all Fredrika B.'s charming pictures of domestic life in Sweden. Encouraged by its enthusiastic reception, Mrs. Howitt subsequently published translations of *The Diary*, *The H. Family*, *The President's Daughters*, *Brothers and Sisters*, *Life in Dalecarlia*, and *The Midnight Sun*. In 1849, Miss B. visited the United States, and there spent two years, passing some time in England on her return. In her *Homes of the New World*, published simultaneously in England, America, and Sweden, in 1853, she not only presents us with exquisite descriptions of scenery, and vivid pictures of social life, but with sound and comprehensive views on political and moral subjects. Returning to her home in Sweden, to find a beloved sister dead, Miss B. devoted her talents and energies to the carrying out of certain philanthropic objects, in which she had throughout life felt deep interest, more especially the education of the poorest classes. As a writer of fiction, she was distinguished for feminine delicacy, shrewd sense, humor, deep knowledge of human nature, and a graphic and forcible style. Her works have been translated into almost all the languages of Europe. She died in 1865. Her life and unpublished writings were issued by her sister Charlotte in 1868.

BRENDAN, or BRANDANUS, the legendary hero of great ocean voyages made under the protection of angels; revered in Ireland as a saint, where, and in England, he is supposed to have founded religious establishments. His death is set down in 578 A.D.

BRENHAM, city and co. seat of Washington co., Tex., on the Gulf, Colorado, and Santa Fé, and the Houston and Texas Central railroads, 72 m. w.n.w. of Houston. It is in an agricultural and cotton-raising region, and has a national bank, Blinn Memorial College, high school, daily and weekly newspapers, electric lights, cotton compresses, cotton-seed oil mill, foundries, etc. Pop. '90, 5209; '96, about 8000.

BRENNER PASS, a pass in the main chain of the Alps, on the road between Innsbruck (q.v.) on the n. and Boizen (q.v.) on the s., connecting the s. of Germany with Venice and the n.e. of Italy. The B. P. is the lowest which crosses the main chain of the Alps, the summit being only 4775 feet above the level of the sea. Lofty mountains rise above it to the further height of more than 7500 ft., yet the scenery of the pass is less sublime and interesting than that of any other of the great passes of the Alps. It is open at all seasons of the year. At the summit of the pass is the village of Brenner, a resting-place for travelers, with a pop. of about 400. The climate here is so severe that corn seldom ripens. Here the traveler finds in close contiguity the Eisach, a small stream, which, after growing to be a considerable river, joins the Adige and the Sill, a tributary of the Inn; the one stream flowing to the gulf of Venice, and the other into the Black sea. On 18th Aug., 1867, a railway through the B. P. was opened, and thus a complete line of railway communication was established between Germany and Italy; Boizen having already been connected by a railway through the valley of the Adige with Verona, and so with the whole of Italy—Innsbruck being likewise connected with the railway system of Germany. This work was begun by the Austrian government when Venetia belonged to the Austrian empire, and with the view not only of facilitating military operations, but of restoring the commercial prosperity of Venice, by making it the port of southern

Germany. The prosecution of the works, however, was not arrested by the great political changes which took place. A liberal commercial treaty, recently made between Austria and Italy, binds the two countries together in community of interests, restoring, in fact, the natural state of things with which political animosities had long interfered; and it has been made quite apparent, from the activity with which the roads have been repaired on some of the Alpine passes, and particularly that of the Stelvio, that both Germans and Italians appreciate the importance of an intimate commercial intercourse. The distance from Innsbruck to Botzen in a direct line is only 52 m., but by the windings of the road or of the railway, it is much increased.

**BRENNUS**, the name or rather the title of several Gallic princes, is probably a Latinized form of the Kymric word *branhin*, which signifies a king. The most famous B. was that leader of the Gauls who, in 890 B.C., crossed the Apennines, and hurrying through the country of the Sabines, at the head of 70,000 men, encountered and overthrew on the banks of the Allia (q.v.) the Roman army. Had the barbarians immediately followed up their advantage, Rome might have been obliterated from the earth; but instead of doing so they abandoned themselves to drunken delights on the battlefield, and gave the Romans time to fortify the capitol, whither were removed all the treasures and holy things of the city. When B. entered the gates he found that all the inhabitants of the city had fled, with the exception of the women and children, and old men, the last of whom, with pathetic heroism, had resolved not to survive the destruction of their homes, and so the chief among them, clothed in their robes of sacerdotal or consular dignity, and sitting in the curule chairs, waited the approach of their enemies, and received their death in majestic silence. B., having plundered the city, now besieged the capitol for six months. During the beleaguering occurred the famous night-attack, which would have been successful had not the cackling of the geese, kept in Juno's temple, awakened the garrison. At length, however, the Romans were compelled to enter into negotiations with the besiegers. They offered 1000 lbs. of gold for their ransom, which was agreed to. According to Polybius, B. and his Gauls returned home in safety with their booty; but the rather mythical Roman traditions affirm that, just as the Gauls were leaving the city, Camillus, who had been recalled from banishment and appointed dictator, appeared at the head of an army, attacked them, and, in two bloody battles, slew the whole of the barbarians to a man.

Another B., who occupies a conspicuous place in history, was that Gallic chief who invaded Greece, 279 B.C., at the head of 150,000 foot and 61,000 horse. After desolating Macedonia, B. forced his way through Thessaly to Thermopylae. The Grecian army fled at his approach. B. now rushed on with a division of his great host to Delphi, which he had resolved to plunder; but the Delphians having taken up a very advantageous position on some rocks, resisted his further progress. Assisted by the terrors of an earthquake and a terrible storm, besides, according to reverential tradition, by the supernatural help of Apollo, they utterly routed the Gauls, who fled in dismay. B. was taken prisoner, and drank himself to death in despair.

**BRENTA** (*Medoacus Major*), a river of n. Italy, rises from two small lakes in the Tyrol; flows first in a southern, then in an eastern course through the Venetian territory; passes the towns Cisona and Bassano; receives an arm of the Bacchiglione below Padua.

**BRENTANO**, CLEMENS, known as a novelist and dramatic poet, and as the brother of Goethe's "Bettina," was born at Frankfort-on-the-Main, 1778. He studied at Jena, and afterwards resided successively at Frankfort, Heidelberg, Vienna, and Berlin. In 1818, through a morbid discontent with himself and his fellow-men, he retired to the cloister at Dülmen, in Münster. Latterly he resided at Regensburg, Munich, and Frankfort-on-the-Main, where he led the life of a recluse, and gained a considerable reputation on account of his sarcastic wit. He died at Aschaffenburg, on the 28th of June, 1842. In his earliest poems the peculiarities of the "romantic school" of his time are carried to excess. His dramatic productions, such as *The Merry Musicians*, a *Musical Drama* (Frankfort, 1803), in which there are some gems of lyric poetry; *Ponce de Leon* (Göttingen, 1804), etc., are characterized by great dramatic power, amusing though rather far-fetched wit, and a wonderful flow of humor. Perhaps his most successful piece as a drama, is *The Founding of Prague* (Pesth, 1816). B. was most successful in his smaller novels, particularly in the *History of Caspar the Brave and the Fair Annerl* (2d edit. Berlin, 1831), which German critics call a "chef-d'œuvre in miniature." His last work, the legend of *Gokel, Hinkel, and Gakeleia* (Frankfort, 1838), was intended as a satire upon the times in which he lived. He has received the grateful acknowledgment of his countrymen for his renovation of the good old history of George Wickram, of Kolmar, which he published under the title of *The Thread of Gold* (*Der Goldfaden*, Heidelb., 1809).

**BRENTANO**, LUJO, political economist, b. in Bavaria, 1844, studied at Dublin and several German universities, specializing in the investigation of the condition of the working classes. He belongs to the modern historical school and is classed with the so-called "Socialists of the Chair." His works include treatises on the guilds, on wages, on labor in relation to land, compulsory insurance for working men, the Christian socialist movement in England, etc.

**BRENTFORD**, the co. t. of Middlesex, on both sides of the Brent, at its confluence with the Thames, 7 m. w.s.w. of London, and where the Thames is crossed by a bridge



leading to Kew. It consists chiefly of one long irregular street. Pop. '91, 13,736. It has extensive manufactories, and there are many market-gardens in the vicinity. Here Ironside defeated the Danes in 1016, after expelling them from London; in 1558, six martyrs were burned at the stake; and in 1642 the royalists, under Rupert, defeated the parliamentarians under col. Hollis. There are frequent allusions to it in English literature.

**BRENT GOOSE, or BRENT BARNACLE.** This bird has been already noticed under BARNACLE (q.v.). We add here a few sentences from col. Hawker's *Instructions to Young Sportsmen*, which we borrow from Yarrell's *British Birds*. They refer to wild-fowl shooting on the coasts of Dorsetshire and Hampshire. "Towards Nov. or Dec., we have the Brent geese, which are always wild, unless in very hard weather. In calm weather, these geese have the cunning, in general, to leave the mud as soon as the tide flows high enough to bear an enemy; and then they go off to sea, and feed on the drifting weeds. To kill Brent geese by day, get out of sight in a small punt, at low water, and keep as near as possible to the edge of the sea. You will then hear them coming like a pack of hounds in full cry, and they will repeatedly pass within fair shot, provided you are well concealed, and the weather is windy to make them fly low. Before you fire at them, spring suddenly up, and these awkward birds will be in such a fright as to hover together and present a mark like a barn-door."—The extensive muddy and sandy flats between Holy Island and the coast of Northumberland are a great winter resort of this species. It is also particularly abundant on muddy and sandy flats in Cromarty bay. The markets, both of London and Edinburgh, are well supplied with it during winter. The B. G. is known in some parts of England as the black goose; it is considered the most delicate for table of all its tribe, and is perhaps as much sought after as any. The B. G. differs in its habits from the common gray lag and several other species, inasmuch as it never feeds on fresh-water herbage, its tastes being exclusively salinous. B. G. may be distinguished, when on the wing, by their black bodies and white tails. Folkhard, in his excellent work, *The Wild Fowls*, gives much interesting information regarding this bird.

**BRENTON, EDWARD PELHAM, 1774-1869**; a capt. in the British navy. He wrote a *Naval History of Great Britain, from 1783 to 1822*. He was the founder of the Children's Friend Society.

**BRENTON, WILLIAM, d. Newport, R. I., 1674**; an emigrant from England, who held important offices in the colonies of Massachusetts and Rhode Island, being governor of the latter, 1666-69.

**BRENZ, JOHANN, 1499-1570**; a German reformer under Luther; a writer of great ability and popularity. One of his teachings was that the body of the Lord is everywhere present; hence his followers were called "Ubiquitarians."

**BRESCIA, or BRESCIANO**, a province in Lombardy, Italy, separated from Verona by Lago di Garda; 1845 sq. m.; pop. est. '95, 494,310. The n. part is occupied by a chain of the Rhetian Alps; the remainder, about two-thirds of the province, is a part of the great and fertile plain of Lombardy. The rivers are the Oglio, the Mella, and the Chiese, tributaries of the Po. Corn, flax, hemp, grapes, and olives are cultivated. The mountains yield iron, copper, marble, alabaster, and granite. There are manufactures of silk, wool, cotton, linen, iron, steel, copper, glass, and paper. The chief towns are Rovato, Chiara, Orzinovigo, Monte-Chiaro, Salò, and Pontevico.

**BRESCIA**, a city of Italy, capital of the province of the same name, in Lombardy, about 60 m. e.n.e. of Milan. It is romantically situated on the rivers Mella and Garza, in a wide fertile plain, at the base of several hills. The railway from Milan to Venice passes through Brescia. The city is for the most part regularly built, and, besides two cathedrals, the old and the new, it has numerous ancient churches, adorned with pictures and frescos, including many by masters of the Venetian school. Several interesting antiquities have been discovered. It has a valuable public library, the *Biblioteca Quiriniana*, founded and nobly endowed about 1750, by cardinal Quirini, a munificent encourager of literature. It contains upwards of 30,000 volumes, with many rare manuscripts. The pop. in 1895 was 67,700. B. has manufactures of woollen, silk, leather, paper, etc., and its wine is of good quality. The old name of B. was *Brizia*, and its inhabitants were allied with the Romans when Hannibal crossed the Alps. It was captured by the Huns during their migrations and afterwards passed through the hands of the Lombards, Charlemagne, the Franks, and the Germans. It was taken by the French under Gaston de Foix, in 1512, when it is stated that more than 40,000 of the inhabitants were massacred. The city never fully recovered from the effects of that inhuman sack and pillage. In Mar., 1849, B., as the only important town opposed to Austrian rule in Lombardy, was besieged by Haynau, and forced to capitulate.

**BRESLAU**, the capital of the province of Silesia, Prussia, is situated at the confluence of the Ohlau and Oder. Its pop. was 207,997 in 1870; and in 1895, 373,206, ranking next to Berlin in the latter year. The Oder divides it into two parts, which are connected by numerous handsome bridges. The fortifications have been converted into beautiful promenades, and the ditch has been transformed into an ornamental sheet of water. The streets of the new portion of B. are spacious and regular, and the houses stately and

handsome, affording a pleasant contrast to the somber, massive structures of the old town. Educational institutions are numerous, including a university founded by the emperor Leopold I. in 1702. The city contains a fine library, and has many churches, the most remarkable being the Protestant church dedicated to St. Elizabeth, with a steeple 364 ft. in height (the highest in Prussia), and a splendid organ. The position of B., in the center of the manufacturing districts of the province, secures it a large trade, which its railway connection with all the important cities on every side, in addition to the facilities of communication which the Oder affords, enables it to turn to the best account. It has manufactures of linen, woollens, cotton, silks, lace, jewelry, machines, earthenware, soap, alum, starch, etc., and upwards of 100 distilleries; and a trade in corn, coal, metals, timber, hemp, and flax. B. is a city of Slavonic origin, and was for many centuries occupied alternately by the Poles and the Bohemians. It afterwards passed to Austria, from which it was taken by Frederick II. of Prussia, in 1741. Six years afterwards, it was captured by the Austrians, after a bloody battle, but retaken by Frederick in about a month. From that time until 1814, when its fortifications were completely demolished, it was frequently besieged.

**BRESSANI**, FRANCESCO GIUSEPPE, 1612-72; a Jesuit missionary among the Indians of Canada. In 1644, he was sent to the Huron country, but was captured and tortured by the Iroquois. After great suffering he was sent to the Dutch settlements at Albany, where he was ransomed for a large sum. He returned to France, but came back to missionary work and labored many years among the Hurons.

**BRESSAY**, one of the Shetland isles, e. of the Mainland, and separated from Lerwick by Bressay sound. It is 6 m. long and 3 broad, and is composed of Devonian rocks. It supplied Lerwick with peat, until the proprietor, fearing that the peat might be exhausted, stopped exportation; and it continues to supply the Shetland isles with slates. It has a small pop., chiefly fishermen. Bressay sound is one of the finest natural harbors in the world and is a rendezvous for herring-boats, and for all whalers and other vessels proceeding north. East of B., and separated from it by a narrow and dangerous sound, is a rocky isle, called Noss, 6 m. in circuit, girt on all sides by perpendicular cliffs, and rising abruptly from the sea to the height of nearly 600 ft., with a flattish top. A detached rock, or holm, on the s.e. side of the Noss, used to be communicated with by means of a cradle or wooden chair run on strong ropes, stretched across a yawning gulf, and admitting a man with a sheep to be drawn over at a time.

**BREST**, a strongly fortified city, in the department of Finistère, France, and one of the chief naval stations of the country, is situated in lat. 48° 24' n., and long. 4° 29' w., on the n. side of the bay or road of Brest, which forms one of the finest harbors in the world. The only entrance to the bay is by a narrow channel called *Le Goulet*, which is scarcely a mile wide, and is strongly defended by batteries; the difficulty and danger of access to hostile ships being increased by certain rocks in the center of the channel. A new floating dock, quays, and pier were completed in 1876, at a cost of 23,500,000 francs. The small river Penfel flows through the town, which is, on the whole, irregularly built on an uneven site, and has steep, narrow, dark, and very dirty streets. In some parts communication between the lower and upper parts of the town can be effected only by stairs. The new quarter, the parade, and the quays, are more cleanly. B. has extensive ship-building yards, rope-walks, store-houses, etc.; its industry, indeed, is confined entirely to the equipment of the navy in its various branches. It has telegraphic communication with America by a submarine cable. The Bagnes (q.v.) or hulks no longer exist, the prisoners having been removed to the penal colony of Cayenne. Population in 1896, 74,538. B. is a very ancient place, but it was not of much importance until the 17th century. Its splendid position made it an object of contention to French, English, and Spaniards. In 1631, Cardinal Richelieu resolved to make it a naval station, and commenced the fortifications, which were completed by Vauban, but have since been greatly extended. In 1694, the English under lord Berkeley were repulsed here with great loss. In 1794, the French fleet, under admiral Villaret-Joyeuse, was defeated off B. by the English fleet under admiral Howe.

**BREST-LITOVSK**, a t. in the government of Grodno, Russia, 131 m. s. of Grodno, in 53° 5' n. and 28° 27' e., at the junction of the Mukhovetz and the Bug. It is the seat of an Armenian bishop, who has authority over the Armenians in all the country. It has a varied and extensive trade, by means of the two rivers and the royal canal, in grain, flax, hemp, birch-tar, leather, etc. Pop. '94, 44,140.

**BRETAGNE**, or *BRIT'ANY* (*Britannia Minor*), a peninsula in the n.w. of France, formerly a province, and now divided into the departments of Finistère, Côtes-du-Nord, Morbihan, Loire-Inférieure, and Ile-et-Vilaine, is surrounded by the sea on the n.w. and s.w. Though the height of the mountains is nowhere considerable, their structure gives to the peninsula a wild and savage aspect. Clay-slate forms the center of the country, and masses of granite rise in the n. and the south. The climate is often foggy, and subject to violent storms of wind. Large tracts of land lie uncultivated; but in the well-watered valleys, vegetation is luxuriant. In ancient times, B., under the name of

**Armorica**, was the central seat of the confederated Armorican tribes, who were of Celtic and Kymric origin. Traces of them still remain in the old Kymric dialect of the three most westerly departments, and in the numerous so-called Druidical monuments. The name *Armorica* was changed for that of B., in consequence of the numerous immigrations from Great Britain in the 5th and 6th centuries. The peculiar, shut-in situation, and the characteristics of soil and climate in B., seem to have had a powerful effect on the character of its people. The Breton has generally a tinge of melancholy in his disposition; but often conceals, under a dull and indifferent exterior, a lively imagination and strong feelings. "The tenacity with which the Breton clings to the habits and belief of his forefathers, is apparent by his retention of the Celtic language almost universally in Basse B., and by his quaint costume, which in many districts is that of the 16th century." The greater number of the people are found to be ignorant and coarse in their manners, and their agriculture is of a very rude character, by no means calculated to develop the natural resources of the country. It is a frequent resort for tourists, and, apart from the beauty of its scenery, it possesses great interest, as the only place where men can be seen living and acting much as our forefathers did three centuries ago. Under the Romans, the country, after 58 B.C., was made the *Provincia Lugdunensis Tertia*; but its subjugation was hardly more than nominal, and it was entirely liberated in the 4th c., when it was divided into several allied republican states, which afterwards were changed into petty monarchies. B. became subject to the Franks in the reign of Charlemagne, and was handed over by Charles the Simple to the Northmen in 912. After some fierce struggles, the Bretons appear to have at length acknowledged the suzerainty of the Norman dukes. Geoffroi, count of Rennes, was the first to assume the title of duke of Bretagne in 992. The duchy of B. was incorporated with France in 1532, by Francis I., to whom it had come by marriage, and subsequently shared in the general fortunes of the empire, but retained a local parliament until the outbreak of the revolution. During the revolution, B., which was intensely loyal, was the arena of sanguinary conflicts, and especially of the movements of the Chouans (q.v.), who reappeared as recently as 1832. Daru, *Histoire de B.* (Par. 1826); Roujoux, *Histoire des Rois et des Ducs de B.* (Par. 1829); Courson, *La B. du 5<sup>e</sup> au 12<sup>e</sup> Siècle* (1863); Le Saint, *La B. Ancienne et Moderne* (1873); De Kerorguen, *Recherches sur les États de B.* (1875).

**BRETHREN, WHITE**, a sect of the 15th c. that sprang up in the Italian Alps. Their leader claimed to be Elias the prophet; they were clad in white, and carried crucifixes from which blood appeared to come. The leader, who appears to have left no name, prophesied the destruction of the world, and for a time had great success; but Boniface IX. seized the prophet and burnt him at the stake, and within a year the sect passed out of existence.

**BRETHREN OF THE CHRISTIAN SCHOOLS**, an order established at Rheims in 1679, and sanctioned by Benedict XIII. in 1725, having for its object furnishing the poor with instruction. In Paris, in 1792, they refused to take the oath of obedience to the civil constitution, and were driven from their houses and prohibited from teaching. In 1801, they returned and soon spread over France, Italy, and other countries. About 1880, they opened evening schools for adults. Their chief house is in Paris, and in 1868 they had more than 10,000 brethren, teaching 800,000 persons in France alone. There are a number of them in the United States. See LA SALLE, JEAN BAPTISTE DE.

**BRETHREN OF THE HOLY TRINITY**, a society of the 13th c., in France, whose members were pledged to give a third of their revenues towards the redemption of Christians who were in Mohammedan or infidel slavery.

**BRETIGNY**, a village of France, in the department of the Eure-et-Loir, about 6 m. s.e. of Chartres, on the railway between Paris and Orleans. B. is celebrated as the place where, in 1360, Edward III. concluded a peace with France, by which John II. of France was released from his captivity in England, on agreeing to pay 3 million crowns for his ransom, England renouncing her pretensions to Normandy, Anjou, Maine, and Touraine, and being confirmed in her possession of Gascony, Guienne, and several other parts in France recently acquired by conquest.

**BRETON, ÉMILE**, b. France, 1831; bro. of Jules. He became an artist in 1857, after trying the army, and business life. During the Franco-German war, he re-entered the army, commanding a battalion, and was decorated for bravery at the battle of St. Quentin. Among his landscapes are "Canal of Courrières," and "Sunset in Autumn."

**BRETON, JULES ADOLPHE**, b. 1827; a French painter, excelling in rural life and scenes; commander, Legion of Honor, 1889; recipient of many medals. Among his paintings are "The Gleaners," "Evening," "Blessing the Grain," "The Weeders," "The End of the Journey," etc. He published *Les Champs et la Mer*, poems (1875); *Jeanne*, a poem, for which he received the Montyon prize of the French Academy (1876); and *The Life of an Artist* (1890).

**BRETON DE LOS HERREROS**, Don MANUEL, the most popular of modern Spanish poets, was b. 19th Dec., 1800, at Quel, in the province of Logroño; received his earliest education in Madrid; and served as a volunteer in the army from 1814 to 1822. Subsequently he held several situations under government, but always lost them on account of his expression of liberal opinion. As early as his 17th year, he wrote a comedy,

entitled *A la Voz de Viruelas*, which, in 1824, was brought upon the stage with great success. Henceforward he furnished theatrical managers with more than 150 pieces, partly original, partly adaptations from the older Spanish classics, and partly translations from the Italian and French, most of which have been highly popular. In addition to these, Breton de los Herreros published *Poesías Sueltas* (Madrid, 1831, and Paris, 1840); several volumes of satirical verse; a long humorous poem, called *La Desvergüenza*, *Poema Jocosario* (Madrid, 1858), etc. All Breton de los Herreros's poems are remarkable for their singularly sweet, yet powerful diction, and for the harmony of the versification. His peculiar sphere is the comic and the satirical, in which the Spanish or national qualities of his genius find their freest expression, and in which also he displays most ease and self-reliance. Breton de los Herreros superintended the issue of a collected edition of his poetical works in 1850-52 (5 vols., Madrid). He died at Madrid in Nov., 1878.

**BRETSCHNEIDER, HEINRICH GOTTFRIED**, a man remarkable for his unsettled life, eccentric habits, and satirical writings, was b. at Gera, Mar. 6, 1739. He was first sent for education to the institute of Herrnhuters at Elbersdorf, and afterwards to the gymnasium at Gera. He became capt. of horse in a Prussian volunteer corps, in which service he was made prisoner, and retained in a French fortification till 1763. In 1775, B. visited England, France, and Holland; and in 1778 was nominated librarian to the university of Ofen, where he was persecuted by the Jesuits, whose hatred he had excited. This circumstance brought him under the notice of Joseph II., who, in 1782, appointed him one of the inspectors of studies. He died in Nov., 1810. B. was the author of tales, poems, and satires. The latter are attacks upon every kind of injustice and falsehood. In his "Almanac of the Saints (*Almanach der Heiligen*) for the year 1788, with copper-plates and music, printed at Rome, with the permission of the principals," the priesthood is severely attacked, and the legends of the monks ridiculed. Like Nicolai, B. was very bitter against the "Werther" mania which was so prevalent in his time.

**BRETSCHNEIDER, KARL GOTTLIEB**, a distinguished German theologian, b. 11th Feb., 1776, at Gersdorf, in Saxony, studied theology at Leipsic, was appointed pastor at Schneeberg in 1807, general superintendent at Gotha in 1816, and in 1840 obtained the dignity of a councillor of the upper consistory. He died 22d Jan., 1849. B. has acquired a reputation for sober, reflective, rationalistic thought. The character of his intellect rendered him unable to enter into the profound speculations of men like Schleiermacher and Schelling; but nevertheless, by his diligence, clear, incisive understanding, and strength of character, he has secured a permanent place in the history of German theology. His most important work in dogmatics is the *Manual of the Evangelical Lutheran Church* (2 vols., Leip. 1814-18). In 1824, B. published *Lexicon Manuale Græco-Latinum in Libros Novi Testamenti* (3 vols., Leip. 1824). In 1833, appeared *Der Simonismus und das Christenthum*; in 1835, *Die Theologie und die Revolution*. B. also published many sermons, which have been well received, and in other departments of theology and literature he is considered to have done important service.

**BRETT, WILLIAM BALIOL**, first LORD ESHER, jurist, b. Chelsea, England, in 1815; called to the bar, 1846; solicitor-general, 1868; judge, 1868-76; lord justice of appeal, 1876-83; appointed master of the rolls, 1883; and raised to the peerage in 1886.

**BRETTON**, a t. of Baden, about 13 m. e. of Carlsruhe, chiefly noteworthy as the birthplace of Melancthon. The house in which he was born is pointed out to travellers. Pop. about 4000.

**BRETT'S AND SCOTS, THE LAWS OF THE** (Lat. *Leges inter Bretlos et Scotos*, old Fr. *Usage de Scotis et de Bretis*), the name given, in the 13th c., to a code of laws in use among the Celtic tribes in Scotland. The "Scots" were the Celtic people dwelling in the western and more mountainous districts n. of the Forth and the Clyde, who, when it became necessary to distinguish them from the Teutonic inhabitants of the low country, received the names of "the wild Scots," "the Irishry of Scotland," and, more recently, "the Scotch highlanders." The "Bretts" were the remains of the British or Welsh people, who were at one time the sole or chief inhabitants of the region now divided into the shires of Dumbarton, Renfrew, Ayr, Lanark, Peebles, Selkirk, Roxburgh, Dumfries, and Cumberland. This province was for some centuries an independent kingdom, known by the names of "Cambria," "Cumbria," "Strathclyde," and "Strathclyde and Reged." It became, about the middle of the 10th c., a tributary principality held of the king of the English, by the heir of the king of the Scots. It so continued till after the beginning of the 12th c., when Cumberland having been incorporated with England, the gradual absorption of the rest of the territory into the dominions of the king of the Scots seems to have been imperceptibly completed. The last "prince of Cumbria" named in record was the brother and heir of king Alexander I. of Scotland, "the earl David," as he was called, who, on his brother's death in 1124, himself became king of the Scots. No more is heard of Cumbria as a principality; but "the Welsh" continue to be named among its inhabitants, in the charters of king David's grandsons—king Malcolm the Maiden (1153-65), and king William the Lion (1165-1214). And they seem to have retained more or less of their ancient Celtic laws until after the

beginning of the 14th century. It was not till the year 1805 that an ordinance of king Edward I. of England, who appeared then to have reduced all Scotland to his subjection, decreed "that the usages of the Scots and the Bretts be abolished, and no more used." It is unknown how far this prohibition took effect. Of the code which it proscribed, only a fragment has been preserved. It was first printed by sir John Skene, in his *Regiam Majestatem* (Edin. 1809). But by far the best edition is that of Mr. Thomas Thomson and Mr. Cosmo Innes, in the *Acts of the Parliaments of Scotland*, vol. i. pp. 299-301 (Edin. 1844), where the laws are given in three languages—Latin, French, and English. The French version, which is the oldest, is printed from a manuscript of about 1270, formerly in the public library at Bern, in Switzerland, now in the register house at Edinburgh. The fragment of the "laws of the Bretts and the Scots" thus published, is of much the same nature as the ancient laws of the Anglo-Saxons, the Welsh, the Irish, and other nations of Western Europe. It fixes the *cro*, or price at which every man was valued, according to his degree, from the king down to the churl, and which, if he were slain, was to be paid to his kindred by the homicide or his kindred. The *cro* of the king was 1000 cows; of the king's son, or of an earl, 150 cows; of an earl's son or of a thane, 100 cows; of a thane's son, 66½ cows; of the nephew of a thane, or of an ogthiern, 44 cows and 21½ pence; and of a villain or churl, 16 cows—all persons of lower birth than a thane's nephew, or an ogthiern, being accounted villains or churls. The *cro* of the married woman was less by a third than the *cro* of her husband. The *cro* of the unmarried woman was as much as the *cro* of her brother. Other chapters fix every man's *kelchyn* or *getchach*, *gallnes*, and *enouch*—Celtic terms not yet satisfactorily interpreted, but apparently equivalent to the *fyhtwite*, *mund*, and *manbot* of the Anglo-Saxon, as the *cro* of the Bretts and Scots appears to answer to the *wergild* of the English. A chapter "of blood-drawing"—corresponding with the *blodwyte* of the Anglo-Saxons—fixes the fine to be paid for a blow to the effusion of blood, according to the degree of the person wounded and the place of the wound.

**BREUGHEL**, or **BRUEGHEL**, the name of a famous family of Dutch painters.—**PETER B.**, the head of the family, was b. in the village of B., near Breda, in 1510 (or, as others say, 1520), and d. at Brussels in 1570 or 1590. He was a scholar of Peter Koeck van Aelst, traveled through Italy and France, and on his return, fixed his residence at Antwerp. He painted chiefly the pleasures of rustic life, for which he himself had a great relish, and which he transferred to his canvas with clear insight and vivid coloring, though unnecessarily exceeding at times the coarseness of his subject. He also executed several historical pieces, such as his "Building of the Tower of Babel," now preserved in the gallery at Vienna.—His son, **PETER B.**, distinguished by the strange title "Hellish Breughel"—because he loved to paint scenes in which the leading characters were devils, hags, robbers, etc.—was b. about 1564, and d. about 1637. His paintings of "Orpheus" and the "Temptation of St. Antony" are the most remarkable of his pieces.—**JAN B.**, brother of the preceding, and on account of the splendid apparel which he wore when he became rich, usually called Velvet B., was b. 1568, and d. 1625. He was an industrious painter, distinguished for his landscapes and for his minute finish of small figures. In concert with Rubens, who supplied the two chief figures, he painted "Adam and Eve in Paradise," and "Vertumnus and Bellona." These, with the "Four Elements," are his chief works.—Other members of the same family were known as painters: **AMBROSE B.**, director of the academy of painting, Antwerp, between the years 1635 and 1670; **ABRAHAM B.**, a painter of fruits, flowers, and birds, lived long in Rome and Naples, where he d. in 1690; **JAN BAPTIST B.**, b. in Rome, d. 1700; and finally, **CASPAR B.**, both of whom were flower-painters.

**BREVARD**, a large co. in s.e. Florida, on the Atlantic ocean; 2446 sq.m.; pop. '90, 8401. It is low, flat, and full of lakes and marshes. Along the coast is Indian river, an inlet of the ocean. Co. seat, Titusville.

**BREVE**. See **ANT-CATCHER**.

**BREVE**, a note in music, which, in the old notation of Guido d'Arezzo, had the value of two whole bars. It is written thus,  $\sqcap$ , or  $\sqsubset$ , or  $\sqsupset$ . The note for a whole bar in modern notation is called semibreve, and has the value of four crotchets. In triple time, the B. contained three semibreves. The B. is now only used in a *la capella* movements, psalm-tunes, and fugues, or at the close of a composition.

**BREVE**, or **BRIEVE**, in the practice of the Scotch law, is a writ issuing from chancery in the name of the crown, to a judge, ordering him to try by jury the points or questions stated in the breve. In ancient times, these writs appear to have been the foundation of almost all civil actions in Scotland; but they are now only used in the following cases: 1. B. of inquest, now, however, superseded by a petition of service, according to the 10 and 11 Vict. c. 47. The object of the proceeding is judicially to ascertain the heir of a deceased person. 2. B. of tutory, the purpose of which is the appointment, as guardian to a pupil, of the nearest agnate or person most nearly related through the father. 3. Breves of idiocy and furiosity, by which the mental condition of a party may be determined for the appointment, in case of ascertained insanity, of a guardian or curator. In the B. of idiocy, the direction is to inquire whether the person is of unsound mind, furious, and naturally an idiot. In the breve of furiosity, it is whether

he be of unsound mind, prodigal, and furious. 4. B. of terce. The object of this writ is to "cognosce the widow to her terce"—that is, to enable her to recover her terce or dower. It is issued to the sheriff of the county, and the jury under his presidency are directed to inquire whether the claimant was the lawful wife of the deceased, and whether the husband died infest in the lands from which the terce is claimed. The verdict of the jury gives the widow her terce, and the judge then "kens" her to it. See **TERCE**, and **KENNING TO THE TERCE**. 5. B. of division amongst heir-portioners. By means of this B., an heir-portioner—that is, one of two or more sisters succeeding in equal portions to a landed estate—may have her share of the lands separated or set apart by a judge, who appoints an inquest, or jury of fifteen persons, to measure the land, and make a division; the jury report to the judge; and lots being cast for the different shares, the judge decides accordingly. The form is, however, now seldom used, an arbitration being more generally resorted to. See **INHERITANCE**, **SUCCESSION**, **HEIR-PORTIONERS**.

**BREVET** (French) meant originally a warrant, or license, or authorization for the use of some privilege, rank, or title. As a military term it is used both in England and in this country. In the United States it is a commission giving to an officer a nominal and temporary rank higher than that for which he has a salary. Many *brevet* titles were thus given during and after the civil war. In England, the term once designated a promotion given on some special occasion, as, for example, a coronation, or the termination of a great war, and was limited to officers who had some special claim to the distinction. The officers so promoted obtained an increase of rank, and in some cases pay, even if they had never served in the field. A brevet was determined on by the cabinet, and carried out by the commander-in-chief. The officers expected it, as one of the implied conditions on entering the service, and it has formed part of the British military system since the time of James II.; but it was unsatisfactory because the flow of promotion caused by it was arbitrary, uncertain, and much liable to abuse. There were brevets, arising out of the various circumstances above indicated, in 1837, 1838, 1841, 1846, 1851, and 1854. On these occasions lieutenant-generals, major-generals, colonels, lieutenant-colonels, majors, and captains received a promotion of one grade in rank. On one of these occasions 200 colonels were at once made major-generals. The higher the rank, the higher the pay, as a general rule; and therefore the cost to the nation is always increased for a time after each brevet. Thus the brevet of 1837 occasioned an annual increase of £11,000; that of 1838 £7000; of 1841 £15,000; of 1846 £21,000; but it must not be forgotten that death and sales had in the intervals cleared off perhaps an equal number of officers at the higher rates of pay. In 1854 the new major-general alone involved an additional charge of £18,000 a year. In the latter year the giving of brevets was limited very strictly in its application to cases of very distinguished service in the field, and on the principle of seniority.

**BREVIARIUM ALARICANUM**, a collection of Roman laws compiled by order of Alaric II., king of the Visigoths, in 506 A.D. The chief value of this compilation is that it preserves the first five books of the Theodosian code and five books of the *Sententia Recepta* of Julius Paulus, which are nowhere else found.

**BREVIARY**. By this word the Roman Catholics understand the book which contains all the ordinary and daily services of their church, except (a) those connected with the celebration of the Eucharist, which are contained in the *Missal*, and (b) those for special occasions, such as baptism, marriages, ordinations, funerals, etc., which are contained in the *Ritual* (q.v.) or *Pontifical*, according as they fall within the sphere of ordinary priests or of bishops. The word itself signifies an *abbreviation* or *summary*, and is used to indicate that the book is a compilation designed to obviate the necessity of using several books in the same service. An Anglican *Church Service* is a compilation on exactly the same principle and for the same object as well as very similar in contents. The breviary is believed to owe its origin to Gregory VII. in the 11th century. It underwent several changes under succeeding popes, and in 1536, Francis, Cardinal de Quiñones, a Spaniard, published at Rome a reformed breviary which, though perhaps too sweeping in its changes, had the approval of the pope and is of great merit, insuring the reading of the whole Book of Psalms every week, and of almost all the New Testament and a great part of the old every year. Though never made compulsory, its use was permitted in place of the unreformed breviary, until, in 1568, Pius V. issued a reformed edition of the old Roman breviary which he imposed absolutely upon all the Latin churches. This breviary was modified from time to time chiefly by the addition to the calendar of a great number of feast-days in honor of saints, to such an extent that the ordinary service of a week-day became very uncommon, and finally, in 1838, Pope Leo XIII. permitted, though not commanded, the substitution for the week-day service, upon almost every day in the year, of a voluntary office of a festival character according to the day of the week. The state to which the use of the breviary is thus reduced, especially by the virtual abrogation of the weekly reading of the Book of Psalms, is acknowledged on all sides to need reform, and it is probable that a revision on the lines followed by Quiñones will soon be made. The principal Latin breviaries now in use, other than the Roman, are the Monastic, used by all monks and nuns properly so called; the Dominican, used by all disciples of St. Dominic; the Ambrosian, in the

ecclesiastical provinces of Milan; and the Mozarabic, the original national rite of Spain, in use in part of the cathedral and city of Toledo. Wherever the Roman breviary has been introduced it has been subjected to additions to the calendar and other changes, so as to give it a national color. The contents of the breviary, after the general rubrics, tables, calendar, etc., are divided into five parts. The first consists of the Book of Psalms, arranged in section, with different prayers and hymns to be used in the various services of the day and week. The second part of the breviary consists of the *Proprium de Tempore*. This means the whole service for Sundays and week-days as dependent upon Christmas and Easter. The third is the *Proprium Sanctorum*, or special offices of saints, and consists of whatever is special to any day, fixed by the day of the month. It amounts to a series of brief biographies of the saints, which, though drawn up with great care and revised from time to time, show occasional inaccuracies and present a point of attack to controversialists. The fourth part, the *Commune Sanctorum*, is a series of twelve offices for festivals of saints according to the class to which they belong. The Commune Sanctorum is more used than any other part of the breviary. The fifth and last division of the breviary consists of an extra service, the principal of which are the vespers (placebo), and matins, and lauds (dirge) of the dead, and the Little Offices of the Blessed Virgin Mary. While objection may be made to the defective character of the course of scriptural reading, to the biographical notices, and to the practical monotony caused by the multiplication of festal offices, the breviary forms a marvellous mine of powerful and tender religious thought, and as at every separate service nearly all, or by far the largest part of the matter used is the language of Scripture, the office is invested with great grandeur and vitality. The readings form a sort of storehouse, though imperfect, of scriptural, historical, and theological knowledge. The rules for arranging the service for every day, and especially for uniting and harmonizing the *Proprium de Tempore* with the *Proprium Sanctorum*, are contained in the general rubrics, and fill 87 chapters; but so complicated has the system become that it has been found necessary to meet the difficulty by the publication in every separate country or diocese of a sort of annual almanac, called the *Ordo Recitandi Divini Officii*, which contains under every day, clothed in a mass of technical contractions, minute directions as to what is to be read. The duty of publicly joining in, or privately reading aloud, the whole of the breviary services every day, is incumbent upon all clerks in holy orders, all members of religious orders, male or female, and every person holding a benefice (such as a prebend) to which attendance in choir is normally attached. The use of the breviary as a book of private devotion by laymen has become rare since the invention of printing has led to the multiplication of devotional works of different kinds, but at present seems to show some tendency to increase, and it has always been a common custom to sing vespers or compline, at least on Sundays, in parochial and other public churches.

**BREVIARY OF QUIGNON**, a breviary (q.v.) published at Rome about the year 1586 by Cardinal Quignonez or Quiñones. It is said that upon this work the daily service of the established English church is largely modeled, some parts of the preface being embodied entire in that of the Book of Common Prayer (q.v.).

**BREVIER**, a kind of type (q.v.).

**BREWER**, a city in Penobscot co., Me., on the Penobscot River and the Boston and Maine railroad; opposite Bangor, with which it is connected by a bridge. It was incorporated as a city in 1889, and has banking facilities, manufactories of wood pulp, paper, and other articles, and large lumber interests. Pop. '90, 4193.

**BREWER**, DAVID JOSIAH, jurist; b. in Asia Minor, in 1837; graduated at Yale in 1856 and at the Albany (N. Y.) law school in 1858; was for several years a judge in Kansas; became an associate justice of the U. S. supreme court in 1889; member of the Venezuela commission in 1896; and one of the arbitrators for Venezuela under the Anglo-Venezuelan arbitration treaty in 1897.

**BREWING**. Brewing is one of the two processes that are together employed in manufacturing beer from barley, the other being malting. Malting has four stages: *steeping*, *couching*, *flooring*, and *kiln-drying*. Steeping consists in soaking the grain for several days in cold water, by which operation it is softened and swelled, and made to absorb some 20 to 40 per cent. of water. Couching consists in throwing the moistened barley on the malt-house floor when it begins to germinate, throwing out roots and shoots, and giving out at the same time a part of the water. Flooring consists in turning and returning the barley upon the floor to prevent the continuance of the incipient germination. Kiln-drying consists in heating the barley in a kiln, rendering it dry and brittle, when it becomes malt. By this process the original grain has become increased in bulk but has lost in weight.

The next process in the manufacture of beer is *brewing* proper. The malt is passed between heavy rollers that crush it, after which it is placed in a tube containing warm water that is slowly heated to 170° Fahrenheit. It is at this stage of the process that adulterants are sometimes added, usually glucose (q.v.). After the infusion has been allowed to stand for three or four hours, the *wort* is drawn off into a boiler, in which hops are presently placed, and boiled with the wort. From two to four bushels of malt, and from two to five pounds of hops are used in making one barrel of beer, the quan-

tity determining the strength of the beer. See HOP. As soon as the boiling is over, the resulting liquid is cooled with great rapidity, usually by passing it over pipes containing a running stream of cold water. Last of all it is collected in the brewery vats where it ferments, the temperature being regulated to secure quick or slow fermentation. Yeast is usually added to the wort in the proportion of 1 part to 100 parts of wort. After the beer has fermented for a week or so, the beer is separated from the yeast and placed in casks. In these fermentation goes on slowly, and the beer becomes refined and matured. The nature of the beer depends largely upon the kinds of malt that are employed. Thus, *ale* is made from pale malt, and had the active fermentation checked. If the malt has been sun-dried and its fermentation takes place at a temperature less than 70°, the resulting liquid is *pale ale*. *Porter* is made from pale, dark, and black malt mixed. *Lager* ("stored") *bier* is beer that has been stored in a cool place for some months before it is used. Hence it is usually fermented in winter, or if in summer, in vaults cooled by ice. The principal constituents of the various kinds of beer are water, alcohol, sugar, gum, gluten, and the bitter extractive matter of the hop. The amount of alcohol varies: in small-beer, it is only about 1 per cent.; in ale, the stronger kinds of beer and porter for home consumption, 5 to 7 per cent.; in East India pale ale, 10 per cent. In beer intended to be forwarded to California from Britain the attenuation is carried so far that there is more than ten per cent. of alcohol, and the beer is then called *dry*. The successful brewing of beer depends much on the kind of water employed. The water which is found most suitable contains much common salt, sulphate of lime, and carbonate of lime, in a state of solution. The waters employed in the most extensive breweries contain at least 60 grains of earthy salts dissolved in each imperial gallon. Great care must be taken to select water which not only has the proper amount of saline ingredients, but at the same time is free from organic matter, either of animal or vegetable origin. Water containing such is liable to the decomposition and putrefaction of its constituents, and by contamination, causes the beer prepared by means of it to be more liable to go wrong in the brewing, and to possess ultimately an unpleasant taste. Lime salts are thought to render the beer clearer. See BEER, ALE, BOCK BEER; FERMENTATION; LAGER BEER.

**BREWSTER**, a co. in w. Texas; 2640 sq. m.; pop. '90, 710. Co. seat, Alpine.

**BREWSTER**, BENJAMIN HARRIS, b. Salem co., N. J., 1816; graduated at Princeton college, 1834; admitted to the bar of Philadelphia, 1838; and soon rose to the head of his profession. He was appointed atty.-gen. of Penn., 1867, and atty.-gen. of the U. S. under Pres. Arthur, Dec. 16, 1881. He d. 1888.

**BREWSTER**, SIR DAVID, an eminent natural philosopher and eloquent writer, was b. at Jedburgh, Dec. 11, 1781. He was educated for the church of Scotland at the university of Edinburgh, where he highly distinguished himself. In 1808, he undertook the editorship of the *Edinburgh Encyclopædia*, to which he contributed many important scientific articles. Previous to this, he had entered deeply on the study of optics, with which his name is now enduringly associated. The beautiful philosophical toy, called the kaleidoscope, was invented by him in 1816. In 1819, in conjunction with Prof. Jameson, he established the *Edinburgh Philosophical Journal*; and in 1831 he was one of the chief originators of the British association for the advancement of science. The honors conferred on this distinguished man make up a long catalogue. In 1815, he obtained the Copley medal of the royal society for one of his optical discoveries, and soon after was elected a fellow; in 1816, he received half the physical prize bestowed by the French institute for two of the most important scientific discoveries made in Europe during the two preceding years; in 1819, the royal society awarded him the Rumford gold and silver medals, for his discovery on the polarization of light; in 1825, he became corresponding member of the institute of France; in 1832, he was knighted, and had a pension conferred upon him; in 1838, he was chosen principal of the united colleges of St. Leonard and St. Salvador, St. Andrews; in 1849, on the death of Berzelius, in the preceding year, he was elected one of the eight foreign associates of the French Institute, the highest scientific distinction in Europe. Sir David was also a member of the imperial and royal academies of St. Petersburg, Berlin, Copenhagen, and Stockholm; presided over the British association, and in 1851, over the peace congress held in London. In 1859, on the death of Dr. John Lee, he was chosen principal of the Edinburgh University. His principal work is his *Life of Newton*, first published in 1823, in the *Family Library*, and issued in a totally new and greatly enlarged form in 1855. Among his other works are his interesting *Letters on Natural Magic*, addressed to Sir Walter Scott, also published in the *Family Library*; *More Worlds than One* (1854); his treatises on the kaleidoscope and on optics (*Cabinet Cyclopædia*); his *Martyrs of Science*; and his treatises in the *Encyclopædia Briannica* on electricity, magnetism, optics, the stereoscope, etc. Among other periodicals to which he contributed largely are the *Edinburgh* and *North British Reviews*. He died Feb., 1868. See *Home Life of B.* by his daughter, Mrs. Gordon.

**BREWSTER**, WILLIAM, 1560-1644; b. England; one of the pilgrims who landed at Plymouth. He went with Bradford to Holland, where he taught school in English, became an elder in the church, and held the same position in New England, though, as he had never been ordained, he always refused to administer the sacraments. He is more generally known in history as "Elder Brewster."



**BREZO'WA**, a market t. of Hungary, in the co. of Neutra, on a river of the same name, about 19 m. n.w. of Leopoldstadt. It has a Roman Catholic church and a Protestant church, tanneries and distilleries. Pop. 5700.

**BRIALMONT**, HENRI ALEXIS, b. 1821; a Belgian engineer and military writer, and member of various learned societies. He has published a number of works on the art and methods of military fortifications, on which he is accepted as one of the best authorities. He was made lieut.-gen., 1877, and was afterward retired.

**BRIAN BOROIMHE** (pron. *boru'*), a famous king of Ireland, ascended the throne of both Munsters—answering to the present counties of Tipperary and Clare—in 978. Some time afterwards, he deposed O'Maelachaghlin, and became supreme ruler of Ireland. The surname, Boroimhe, signifying tax, was given him in consequence of the tribute in kind he levied from the various provinces. King Brian supported a rude but princely state at his chief castle at Kincora, a place in the neighborhood of the modern town of Killaloe, and he had also seats at Tara and Cashel. The vigor of his reign brought prosperity to his country. He defeated the Danes in upwards of 20 pitched battles, restricting their influence to the four cities of Dublin, Wexford, Waterford, and Limerick alone. In the battle of Clontarf (1014), in which he was killed, he gained a signal victory over a united army of revolted natives and Danes, the power of the latter receiving a shock from which it never recovered.

**BRIANÇON** (ancient *Brigantium*), a t. of the department of the Hautes-Alpes, France, on the right bank of the Durance, about 35 m. n.e. of Gap. It is the highest town in France, being situated at an elevation of nearly 4800 ft. above the level of the sea. As the principal arsenal and depot of the French Alps, B. is very strongly fortified, while several forts guard the approaches, and every height in the vicinity is a point of defense. It is considered impregnable. Troops can readily be marched from it on to the passes of the Simplon, St. Bernard, Mont Cenis, and the Col de Tende. Mont Genève affords a practicable passage into Italy from the town itself. B. has some manufactures of silk, cotton-goods, hosiery, cutlery, crayons, etc. Pop. '86, exclusive of garrison, 3360; '91, 6580.

**BRIANSK'**, or **BRYANSK**, a town of Russia, in the government of Orel, 90 miles by rail west of the city of that name. It is situated on the right bank of the Desna, is surrounded with earthen ramparts, and has a considerable trade in grain, hemp, timber, etc., with Kherson, Odessa, and other ports on the Black sea. Population estimated at 20,200.

**BRIARE**, a t. in the department of Loiret, France, situated on the right bank of the Loire, at the point where the canal de Briare enters that river, about 48 m. s.e. of Orleans. The canal, which unites the Loire and the Seine, is remarkable as the first that was constructed in France, having been begun by Sully, and finished in 1642. B. has a considerable trade in wine, wood, and charcoal. It is supposed to occupy the site of the ancient *Brivodurum*. Pop. about 5400.

**BRIA'REUS**, or **ÆGÆON**, one of the three sons of Uranus and Gæa; the others were Cottus and Gyges, and each of the three had a hundred arms. They assisted Zeus when the Titans made war against Olympus. One account represents B. as assailing Olympus and being defeated and buried under Mt. Etna. As B. is sometimes called a marine deity, it has been thought probable that the hundred arms symbolized the waves of the sea.

**BRI'BERY** is the offering, promising, giving or receiving of money, goods, employment, or personal advantage of any kind with a view to influence unlawfully the receiver in the exercise of a public duty. Such public duties are those of judges, legislators, executive officers of government or state, voters in the exercise of the suffrage, customs officers, and others. A contract founded on such a consideration is absolutely and totally void. The person giving, as well as the one receiving the bribe, is guilty of the crime of bribing. The action of the public officer, or voter, may be influenced negatively as well as positively by bribery; that is, he may be bribed to abstain from the proper exercise of his functions as well as to exercise them unlawfully. It has been held, however, that the offense does not include an unaccepted offer by a public official to accept reward for performing an act (36 Texas, 293). Severe penalties are provided by act of Congress for the offense of bribing members of Congress or other officers of the United States, such as customs officers, jurors of the United States courts, or officials connected with the letting of public contracts. A member of Congress may be accused of receiving bribes either to influence his vote upon a matter of legislation, or to procure appointments through his official influence; in 1870, one member of Congress was expelled and one resigned on account of charges alleging a corrupt distribution of patronage. The several states in their statutes and codes define the offense as applied to courts, officers, and voters within their jurisdictions, and they impose severe penalties of fine or imprisonment, or both, on conviction for bribery.

Judicial bribery is defined by Greenleaf as the "receiving or offering any undue reward by or to any person whose ordinary profession or business relates to the administration of public justice, in order to influence his behavior in office and incline him to act contrary to the rules of honesty and integrity." It is a matter of congratulation that the higher courts of this country have been almost uniformly free from the taint of sus-

picion of bribery. The United States Supreme Court has a spotless record in this particular, and so almost invariably have the higher courts of the several states. In Great Britain, also, during this century, the higher courts of justice have rarely if ever been impeached in this way. How stern a punishment was meted out for this offense in former times is shown by the penalty inflicted on Lord Bacon, the greatest and ablest judicial officer against whom the charge of bribe-taking was ever brought; a fine of £40,000 was imposed, together with the sentence of imprisonment during the royal pleasure, in addition to civil and judicial disabilities laid upon him. In the United States, perhaps the most serious era of judicial corruption was that during the power of the Tweed ring in New York state; in that state in 1871 one judge of the Supreme Court was impeached and removed from the bench, another judge of the same court resigned, and one judge of the Superior Court was tried by the State Senate and dismissed in disgrace. Any attempt to bribe a court is technically contempt, and the offender may be dealt with by the court upon that charge.

Of greater importance and more general danger to the public welfare in our day than judicial corruption, is bribery intended to affect the exercise of the right of suffrage. In England, during the early part and middle of this century, corruption in parliamentary elections was so common as to be the rule rather than the exception. This was due in part, perhaps, to the restriction of suffrage; certainly in great measure to the rotten borough and pocket borough system (see BOROUGH). The Ballot Act was expected to produce a very beneficial result in this direction, but its influence was only partial; in England, as has since proven the case in the United States, the common method of balloting gave too many opportunities to the purchaser of a vote to see that it was cast according to the corrupt bargain. The election law of 1854 was a very stringent one; it defined closely and with great elaboration the crime of bribery in elections, made the offense a misdemeanor, and inflicted a fine of £100 and costs to be paid by a convicted offender to any one who might sue and prove the offense; "treating" was also defined and made an offense, and punished by a fine of £50; any person found guilty of accepting a bribe was to be struck off the polling list; while a candidate for election found guilty of bribery was made incapable of sitting for that borough, county or city in that session of parliament. Notwithstanding this stringent law, bribery continued alarmingly prevalent; it has, however, been wonderfully decreased by two subsequent measures. By one of these (1868) the investigation of disputed election cases was transferred from parliament itself to the judges of the superior courts. The report of the judges holding such an investigation was made to have the effect of a report of an election committee, and on their certificate a commission of inquiry issued. A candidate for election reported by the judges as guilty of bribery was made incapable of election to parliament for seven years. Similar action to this on the part of the American House of Representatives has been seriously urged of late years. It is argued that the necessity of such action is evident from the fact that disputed election cases are almost invariably decided by a strict party vote. The record of the Congress in session in 1890 will be found to afford a striking confirmation of this statement. On the other hand it is argued that it would require an amendment to the constitution to make such a change of procedure possible. It may well be questioned whether even so radical a step as a constitutional amendment may not be called for. The other anti-bribery law of England referred to was the Corrupt Practices Act of 1883, mainly the work of Sir Henry James. It aims to prevent the *payment* of bribes in the first place rather than to punish the *receipt* of them after the act. It strictly forbids the disbursement by a candidate for parliament, or his agent, of money for any conceivable purpose connected with his election, whether legal or illegal, beyond a certain sum, which is fixed in proportion to the number of voters in the borough; thus, in a borough of 2000 voters an expense of £350 is allowed if one member is to be elected, and £525 if two are chosen, while a borough of 66,000 voters is allowed an expenditure of £3000, the maximum. Only one person may make disbursements, either the candidate himself or his authorized agent; and an account must be returned to the proper public official under oath, with vouchers attached of every penny disbursed. So stringent is this rule, that while in the first election held under the law, only one case was reported where the expenditure exceeded the allotted amount, and that case clearly accidental, yet the member involved was forthwith unseated. Under this law it has been held that circumstances may make a public loan, a large subscription to a charity, the employing of electors in public works, or even the giving of a holiday to workmen, a bribery. Heavy penalties in the way of fines and the disenfranchisement of offenders are attached to the violation of the provisions of the law. By an act passed in 1884 English municipal elections were placed under the same general regulations as those for members of parliament.

It has been proposed to introduce into the United States these principles, namely, of limiting the amount to be expended by a candidate for election, of requiring him to submit accounts of his expenditures with vouchers, and of demanding that he take oath as to their correctness. In the State of New York an act of generally similar provisions (but not universal in its application) was passed in 1889. Its partial failure is to be attributed to the fact that the special conditions under which elections are carried on in this country—nomination by caucus, party representation, and the general conduct of the election by the party rather than the individual candidate—were not duly allowed

for. A more effective kind of legislation against corruption at the polls in this country has been the adoption by several states in one form or another of the so-called Australian system. (See **BALLOT**.) Massachusetts, in 1889, New York, in 1890, Connecticut, Indiana and several other states about the same time, have applied this system with beneficial results. Briefly stated, its main points are: (1) an official ballot—all ballots to be printed and distributed by the state, of uniform size and style; (2) secrecy in preparing and marking the ballots; a voter receives from an officer ballots containing the names of candidates of all parties; he then retires to a booth where, in seclusion, he marks the names of those for whom he intends to vote, folds up all the ballots given him, hands the one he votes to the proper inspector, and returns the others to be destroyed. Details of the laws of this kind adopted by the different states need not be entered into here; the main objects, which have been very generally accomplished, have been to keep outsiders from watching or interfering with the voter, to prevent a possible briber from knowing whether the bargain he has made has been actually carried out, and to give the voter every possible opportunity to exercise his will without observation or undue influence. See **BALLOT**.

**BRIC-À-BRAC**, a word formed from the French proverbial expression *de bric et de broc* (which finds a near equivalent in the English "by hook or by crook"), and used to denote a miscellaneous collection of articles of vertu, such as bibelots, curios, odds and ends of pottery, and knicknacks of every description. The rage for collections of this kind sprang up in Europe about twenty years ago. At first it was sporadic, attacking only a few people of wealth and leisure, but it soon developed into an epidemic, crossed the Atlantic about the time of the centennial exhibition in Philadelphia, and covered our shelves and mantelpieces with costly, elegant, grotesque, or ingenious baubles, and our walls with Japanese fans and porcelain dishes of uncouth proportions. Associating itself with the coteremporary craze for decorative art, it found fanatical disciples whose published utterances seemed to imply that the souls to whom Christianity was an obsolete superstition might be regenerated by the saving influences of blue china. The bric-à-brac hunter rivaled the bibliomane in the extravagant prices that he paid for bibelots and curios merely on account of their antiquity or rarity, and without regard to their design, form, color, or beauty. But the first extravagances of the new fashion have almost subsided, and they have left behind in many quarters a genuine love for and appreciation of artistic ceramics, which speaks well for the art future of our country. See **BIBELOT**.

**BRICK**. The earliest examples of this branch of the ceramic art were doubtless the sun-dried bricks of Egypt, Assyria, and Babylonia. Remarkable to say, many of these, which, in a northern climate, the frosts of a single winter would destroy, have been preserved for some 8000 years by the dry, warm atmosphere of those countries. Sun-baked bricks of ancient date are also found in the mud walls of old towns in India. Kiln-baked bricks must have been the products of a later time; but they are found in all the chief ruins of ancient Babylonia, where they were often used to face or bind together walls of sun-dried bricks, and occasionally they were even ornamented with enameled colors. Burnt bricks were employed in the foundations of the tower of Babel (Gen. xi. 3). These ancient bricks, whether baked by the sun or by fire, were all made of clay mixed with grass or straw. The ancient Greeks, probably owing to their possessing plenty of stone, cared little for building with burned clay; but most of the great ruins in Rome are built of brick, and the Romans appear to have introduced the art into England. Interesting historical information has been obtained from the impressions on Roman and especially on Babylonian bricks. In many instances, the Roman bricks found in England have been removed from their original position, and employed in the construction of buildings of later date. The earliest instance in which bricks of the modern or Flemish make occur in England, is Little Wenham hall, in Suffolk, 1260.

*Manufacture of Bricks.*—Clay suitable for the manufacture of common bricks is an abundant substance, but there is a great difference in the nature and quality of the clays found in various localities. The basis of clay consists of hydrated silicate of alumina, with a varying proportion of other mineral matters, chiefly free silica (sand), iron, lime, magnesia, and potash. Great advantage is derived from digging clay in autumn, and exposing it all winter to the disintegrating action of frost. This is not always attended to, but when neglected, the bricks made from it are apt to be unsound, and faulty in shape. The next process is that of tempering or mixing the clay into a homogeneous paste, which is sometimes done by the spade, but more commonly in the pug-mill (see article *Pottery*) or by crushing between a pair of rollers; often, indeed, both are employed. In making bricks by the old hand process, the shape is given by a mold either entirely of wood, or of wood faced with metal, and without top or bottom. This admits of the clay being pressed into it by a tool called a plane, which is also used to produce an even surface on the upper and lower beds of the brick, by working off the superfluous clay. Sand is used to part the wet clay from the mold and the table on which it rests.

Although hand-made bricks are still very common, yet machinery is now always employed when large quantities are required. Brick-making machines are of two leading kinds; one class of them being constructed to work the clay in a wet plastic state, the other class requiring it to be in a semi-dry condition. Of the two sorts, the wet-

clay machines are the simpler, cheaper, and can be worked by less-skilled workmen. On the other hand, the dry-clay machines, which make the bricks by forcing the clay into molds by strong pressure, shorten the process, as no time is required for drying them. The bricks so made, too, are not only of a more perfect shape, but they can be molded into any form, and may even be made highly ornamental at a very slight additional cost.

As might be expected, both the dry and the wet-clay machines of different makers vary considerably in their details. The general plan on which most of the wet-clay machines work is as follows: The machine is driven by steam, and the clay is fed by a hopper into a pug-mill, on the central shaft of which strong pugging blades are placed in a spiral manner. These prepare and force the clay out at the bottom, whence it passes over the carrying rollers to the pressing rollers, which force it through a die in a rectangular stream, so exactly shaped to the required size that nothing more is necessary than to cut it into single bricks by wires. These are set in a rocking frame, which can be so adjusted as to cut the bricks on the square or at an angle; the one plan being adopted when the clay is at rest, the other while it is in motion. When double-ended, the clay is forced out at opposite sides of the pugging cylinder, and there is then, of course, a cutting-table at either side, instead of only one. Some of these machines are provided with a pair of powerful crushing rollers, which reduce any hard lumps or stones before the clay enters the pug-mill.

The green bricks, after being carefully dried, either in the sun or by artificial heat, are usually baked in a kiln with a suitable arrangement of fires and flues. Kilns are of many forms, and the time required for firing in them varies from 40 to 60 hours for common red and white bricks, while for some fire-bricks 150 hours are necessary. Where kilns are not used, bricks are burned in clamps, the clay requiring to be mixed up, in the process of tempering, with a quantity of ground coal sufficient to burn them. A good test of the character of a clay is obtained by the result of firing. The average contraction in the kiln for prepared clays is  $7\frac{1}{4}$  per cent. If a brick contracts much more than this, the clay is too fusible; if less, then it is likely to be of an open porous body, which retains its shape well during the firing process.

All brick clays contain iron, and the color of a burned brick almost entirely depends on the amount of it which is present; thus clays containing less than 1 or  $1\frac{1}{4}$  per cent of iron, change in the kiln to various shades of cream color and buff, whilst those containing more than 2 per cent, range in color from yellowish-fawn to dark red. Blue bricks are made from the same clay as the red, by controlling in a peculiar way the supply of air in firing, and by carrying the heat slightly further.

Much attention has been paid of late years to the manufacture of fine bricks and terra cotta, which is only another name for ornamental bricks of various shapes, or architectural enrichments of the same material. The effect of some of the public buildings recently erected in Boston and elsewhere, in which terra cotta has been used, is really beautiful. Although it cannot be said to equal sandstone in appearance, it has yet the advantage of giving a much greater variety of color, and is infinitely better and more enduring than a facing of stucco or cement.

Bricks are now made in the United States in nearly the same manner as in England. The size varies in various sections from  $7\frac{1}{2}$  to  $8\frac{1}{2}$  in. long, 4 to  $4\frac{1}{2}$  wide, and 2 to  $2\frac{1}{2}$  thick, and is therefore smaller than that of English bricks, which are usually 9 by  $4\frac{1}{2}$  and  $2\frac{1}{2}$ . Philadelphia pressed bricks are in great demand for outer or front walls in consequence of their perfection. Immense quantities of bricks are made at Haverstraw and other places on the Hudson river. Excellent fire-brick are made at South Amboy, N. J.; at Athens, on the Hudson; at Chicago, Peoria, and other places. Milwaukee bricks have a pleasing yellowish cream color; and these, with others variously colored in the manufacture, find much favor for outer walls. Bricks stand fire better than stone. See ADOBE.

**BRICKLAYING—BRICKWORK.** The material of which a town is built depends mainly on the geology of the surrounding district. In a mountainous country like Scotland, cities of stone, such as Edinburgh, Glasgow, and Aberdeen, naturally abound; while London and most of the great towns of England, situated in alluvial valleys and plains, are built of bricks derived from the alluvial clay beneath and around them. In Holland, where the whole country is but the delta of the Rhine, and no stone is to be found, brick is universal, even to the paving of the streets.

The standard size of English bricks being 9 in. by  $4\frac{1}{2}$ , the thickness of walls is regulated thereby. They are either half-brick, 1 brick,  $1\frac{1}{2}$ , 2, 3, or 4 bricks in thickness. In moderate-sized modern English houses, the inside partition-walls are usually half-brick, the outer walls, 1 or  $1\frac{1}{2}$ . In larger houses of superior construction, a thickness of two or three bricks is sometimes used. This latter thickness is seldom exceeded, except in large public works. Modern brick-houses are, for the most part, far less substantial than those erected by our forefathers. Building leases being usually granted for ninety-nine years, at the expiration of which term, the whole property reverts to the freeholder, the object of the builder is merely to make a house that shall stand for that period, and not to expend any money for the sake of further stability. Garden-walls are commonly built but half-brick in thickness; these, however, are strengthened by 9-in. piers at intervals of 10 or 12 feet. In laying the foundations of walls, the first courses

should be thicker than the intended superstructure, and the projections thus formed, usually of quarter brick on each side, are called "set-offs." Before laying walls of houses, trenches are dug, and the foundation tried with a crowbar or rammer. If it is found to be loose, and the looseness due to superficial soil, this is removed, and its place supplied with fragments of stone and old broken bricks, which are closely rammed together. In some cases inverted arches of brick are built for foundation, or a stratum of concrete laid down. See CONCRETE.

Mortar composed of lime and sand is the common cement for brickwork. It should be equally and carefully applied; and the bricks wetted, in order that the mortar may adhere more firmly, by being absorbed into their pores. The force with which good mortar is capable of adhering to bricks is very remarkable. It is found to be the greatest in old structures that have been exposed to the continuous action of water. Such B. is said to be "water-bound" by workmen, and can scarcely be separated without breaking the bricks.

A fundamental principle to be rigidly observed in laying all kinds of brick is, that *no two contiguous perpendicular joints shall fall immediately below each other*, or, to use the bricklayer's phrase, the work must "break bond." The mode of arrangement of the bricks to effect this is called the *bond*; a layer or stratum of bricks is called a *course*. Bricks laid with their lengths in the direction of the course, and their sides to the wall-face, are called *stretchers*; those laid across the line of the course, with their ends forming the wall-face, *headers*; a layer of headers; a *heading course*, of stretchers, a *stretching course*.

In constructing arches of brick-work, much care and skill are required. A wooden centering is always used; and when very rude work only is required, common bricks are laid upon the centering, and the gaping interstices at the upper ends filled with rough brick wedges. For better work, each brick has to be properly beveled, according to the curve. When semicircular arches are made, all the bricks require an equal bevel, and therefore bricks molded uniformly to the required angle may be used; but for other curves and for flat arches, each brick has to be separately shaped by the brick-layer. In order to do this, a drawing of the required arch is made of the full size on a board; the bricks are laid upon this side by side, and shaped to the lines of the drawing; they are then transferred to their corresponding place in the structure. The bricks are first rudely shaped by the *brick-axe*, then finished on the *rubbing-stone*, a piece of rough-grained stone about 20 in. in diameter. In all kinds of B., the walls should be built up level throughout, in order that the *settlement* may be equal. An unequal settlement may produce a rupture of the wall.

B. is measured by the rod or by thousand. A rod contains 273 sq.ft. of standard thickness—that is,  $1\frac{1}{2}$  brick. This is equal to 306 cubic ft., and will, on an average, require 4500 bricks, allowing for waste. The weight of a rod of B. containing 4500 bricks, 27 bushels of lime, and 3 single loads of sand, is about 18 tons. The bricklayer is always attended by a laborer or hodman, who carries his bricks and mortar in a "hod"—a triangular wooden box, open at the top and one end, and supported on a round leg, by which the hodman holds it on his shoulder. A bricklayer's wages are considerable higher than those of the hodman.

The surface of brick-work is sometimes ornamented by *pointing*. This is done by raking out the mortar of the joints to a small depth, and filling up again with blue mortar, and marking the courses with the edge of the trowel. This is called *flat-joint* pointing. When the courses are marked by a neatly pared raised line of white plaster of about half an inch in thickness, laid upon the blue mortar, it is called *tuck* or *tuck-joint* pointing. Colored bricks, as a means of external ornament, have been extensively and most effectively used in N. Italy and Germany.

**BRICOLLE.** See BALISTA.

**BRIDE—BRIDAL.** The word bride (the radical signification of which is thought by some to be "appropriated," "owned") is common to all the Gothic languages, and also to Welsh (Ger. *braut*, Welsh *prïod*), and signifies betrothed or newly married. Alone, the word denotes the newly married woman; with the addition of the syllable *groom* (a corruption of *guma* = Lat. *homo*, a man), it denotes the newly married man (Ang. Sax. *brydguma*, Ger. *bräutigam*). In Welsh, *prïod-fab* (betrothed youth) is bridegroom, and *prïod-ferch* (betrothed maid) is bride. Bride is the root of a variety of terms connected with marriage, as bride-favors, bride-cake, etc. Bridal is for *bride-ale* (Ang. Sax. *bryd-eale*), the marriage-feast. Bridemaids, or attendants on brides, appear to have been in use among the Anglo-Saxons, and are mentioned in early accounts of marriage ceremonies. A part of their duty consisted in dressing and undressing the bride. Bridemaids, as mere ceremonious attendants at marriages, are still in use in England. The husband had an analogous body of attendants, called bridegroom-men; but they have disappeared in modern usage, and their only representative is one confidential friend in attendance. In Scotland, this personage is called the best man. One of his duties is to pull off the bridegroom's right-hand glove, while one of the bridemaids does the same service for the bride, when the pair are requested to join hands.

**BRIDE-FAVORS** are small knots of white ribbons, which are pinned to the breasts of all who are in attendance at weddings, nor are even the postboys and their horses' heads left undecorated with these gay trappings. The origin of the bride-favor is said to be the true-lovers'-knot—something symbolical of the union of hearts and hands on the

occasion. In various old plays and poems there are allusions to bride-favors or ribbons, as that in Herrick's *Hesperides*:

What posies for our wedding-rings,  
What gloves we'll give and ribbonings

The BRIDE-CAKE is also symbolical in its origin. "The ceremony used at the solemnization of marriage among the Romans was called *confarreatio*, in token of a most firm conjunction between the man and wife, with a cake of wheat or barley. This, Blount tells us, is still retained in part with us, by that which is called the bride-cake used at weddings."—Brand's *Popular Antiquities*. The old English and also Scottish custom of breaking a cake over the head of the bride on entering her new dwelling, perhaps points to a usage of the most remote antiquity—the sprinkling with wheat as a token of plenty. In modern times, the bride-cake is a stately piece of confectionary, consisting of a rich cake as a basis, on which is reared a castellated structure, with various fanciful devices, the whole being covered with a preparation of white sugar. This fabric is cut up and given in pieces to the guests, as part of the wedding joviality.

**BRIDE, St.** See BRIDGET.

**BRIDEWELL**, a well between Fleet street and the Thames, dedicated to St. Bride, which has given its name to a palace, parish, and house of correction. A palace, described as "a stately and beautiful house," was built here, in 1522, by Henry VIII., for the reception and accommodation of the emperor Charles V. and his retinue; and king Henry himself also often lodged here, as, for instance, in 1525, when a parliament was held in Blackfriars; and in 1529, the same regal personage and his queen, Catharine, lived in the B. while the question of their marriage was argued. In 1553, Edward VI. gave it over to the city of London, to be used as a workhouse for the poor, and a house of correction "for the strumpet and idle person, for the rioter that consumeth all, and for the vagabond that will abide in no place." Queen Mary having confirmed the gift, it was formally taken possession of in 1555 by the lord mayor and corporation. The B. was afterwards used for other persons than the class above named, and at last became a place of punishment, till its removal in 1864.

By the 15 and 16 Vict. c. 70 a new house of correction was established for the city of London. See CORRECTION, HOUSE OF.

**BRIDGE** (Ang.-Sax. *brycg*; Dutch, *brug*; Ger. *brücke*) is a structure for carrying a road over a stream, river, ravine, low ground, or other impediment to its course. A bridge for carrying a canal or other water-course, is called an aqueduct (q.v.); one for carrying a railway is sometimes called by the recently coined, though not very correct, word *viaduct* (q.v.). Bridges are formed of stone, brick, cast-iron, or timber arches; of timber beams or frame-work, supported on piles or on masonry; of iron cables or chains, in which case they are called suspension-bridges; of lattice-work; or of cast or wrought-iron girders. Sometimes a combination of beams and suspension-rods is used. Tubular or hollow wrought-iron girders have been occasionally employed, the first great example being the Britannia bridge (q.v.).

Bridges are either fixed or movable. Of movable bridges there are various kinds. *Flying-bridges* and *floating-bridges* are, in fact, mere ferry-boats (see FERRY) with gangways attached, and other provisions for safe and ready transport, and which are drawn across the stream by ropes. *Draw-bridges* and *swing-bridges* are constructed in two parts, that turn on pivots—in the former, the parts are lifted vertically; in the other, they are moved round horizontally. A *sliding-bridge* runs backward and forward on wheels or rollers. Another kind is much in use in low districts in England, where the water flows lazily, and almost on the land-level. These are sometimes called pontoon-bridges, from the movable roadway being balanced at a small height above the water-level on a pivot working in a large pontoon or hollow cylinder sunk in the bed of the river—the ends of the roadway of the B., when laid across the river, resting freely on piers on either side. There are several such bridges in use over the Ouse. The pivot is set in the center of the stream, and, when necessary, the B. is turned round on it by machinery, till it lies parallel to the banks, and permits the passage of barges on either side. In a flat district, these bridges are exceedingly appropriate. See also BRIDGE, MILITARY.

Convenience must have led men in a very rude state of society to form bridges, in order to the easier communication between districts separated by rivers. On most streams there occur fords, but often these are not to be found where they would be most desirable. The most rudimentary form of a B. may be assumed to be a series of stepping-stones, such as are yet almost everywhere to be found on river-courses at some point. Large stones deposited in the streams at the shallows or fords, would first give a chance to a passenger of getting across dry shod; by and by, where one or two stones were wanting to complete the steps in the passage, they would be supplied. Next, it would naturally occur to give greater security to the passage, by laying planks or trees across the stepping-stones, so as to avoid the risks attending stepping or leaping from the one to the other. In the arrangement of planks resting thus on stones, we have the first advance in the art of bridge building, the suggestion at once both of piers and roadways; and beyond this stage, the art would appear not to have advanced for a very long period. From the Greeks, we have accounts of bridges built by Semiramis,

Darius, Xerxes, and Pyrrhus; and in Egypt, necessity early compelled the formation of bridges in connection with the canals constructed for the purpose of irrigation. But all these would appear to have been rudimentary in form, and to have consisted simply of piers, with the intervals between them spanned by beams of timber or large flat stones. Sometimes boats moored in the stream served the purpose of piers, as was the case with the famous B. of Xerxes across the Hellespont. Bridges of boats are in use to this day. The principle of the arch was long known before it was applied to the art of bridge-building. See ARCH. That application we owe to the Romans, whose first great work in which the arch was employed, the Cloaca Maxima (q.v.), is referable to the time of the Tarquins. The Ponte de Rotto, or Senators' B. (127 B.C.), erected by Caius Flavius, appears to have been the first instance of its application to bridges. In the course of the great engineering undertaking of the Roman empire under Augustus Cæsar for the formation of roads and supply of water to Rome, its application became general; and afterwards, the empire having extended its bounds, the necessity for ready communication between its provinces, led to the erection of numerous splendid bridges therein, many of which, indeed, surpassed in their greatness those of Rome itself. But although the Romans have unquestionably the merit of having originated the art of bridge-building proper in Europe, yet it seems doubtful whether the principle of the arch was not applied by eastern nations to bridge-building long before the dawn of the greatness of the Roman empire. The Chinese are said to have been before the west in this as in other arts, though the antiquity of some of the bridges on which this assertion is rested may well be doubted, considering the uncertainty which pervades the chronology of that extraordinary people.

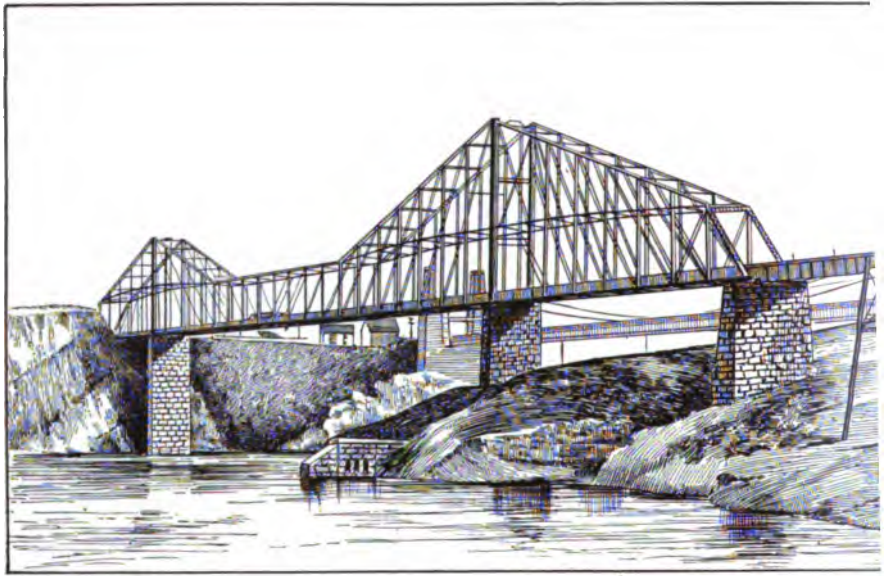
It is impossible here to trace in detail the progress of the art. For a long time after the decay of the Roman empire, it made no progress. It revived in the 11th c., but again languished to the beginning of the 18th, when the formation of the corps of the Ponts et Chaussées in France favored its further growth. Henceforth, many splendid bridges were erected both in Britain and the continent. In 1775, Mr. Pritchard of Shrewsbury, introducing the use of cast iron in the erection of bridges, originated a valuable style of construction. The genius and works of Telford bring us to the present time. Within half a century, the use of steam, the development of the canal system, and the necessity especially for railway-bridges, with the immense amount of capital at the disposal of engineers for purposes of bridge-building, have caused a rapid evolution of all the principles and possible modes of the art. Among the new forms called forth within the century by the increasing demand for facilities of communication, are the suspension B., the wrought-iron girder and tubular bridges, and the lattice-bridges. Several of the new bridges over the Thames are models of engineering skill and taste. The Menai and Britannia bridges were regarded when erected as perfect marvels of the art, and yet they have since been surpassed. In America, the B. of Trenton, over the Delaware, the great Portage viaduct, and the Niagara suspension B., are equal to any similar works in the world. The Tay B., opened in May, 1878, is the longest (2 m. in length) and perhaps the greatest achievement of modern engineering skill. The variety of complex structures of wood and of iron that now span streams and hollows is endless. For some of the more important forms, see FRAME, LATTICE, TUBULAR, and SUSPENSION BRIDGES. What follows here, relates chiefly to arched or masonry bridges, and is confined to the more general and obvious conditions which such bridges must fulfill, avoiding the mechanical theory of their stability as too abstruse for popular exposition.

An arched B. rests between masses of masonry on opposite sides of a river, called its *abutments* (q.v.). The intermediate points of support of the arches are the piers (q.v.), which are rarely built so strong as to be able of themselves to resist the lateral thrust of the arches resting on them, if the thrust of one arch did not counteract that of another. The arch itself is the curved construction between adjacent piers. The chief terms used in speaking of the arch itself are explained under ARCH. In addition, may be noticed the *spandril*, the name given to the filling in above the extrados to the roadway. The *chord* or *span* is the distance between the piers; while the *rise* of the arch is the perpendicular distance between the level of the springing and the horizontal through the key.

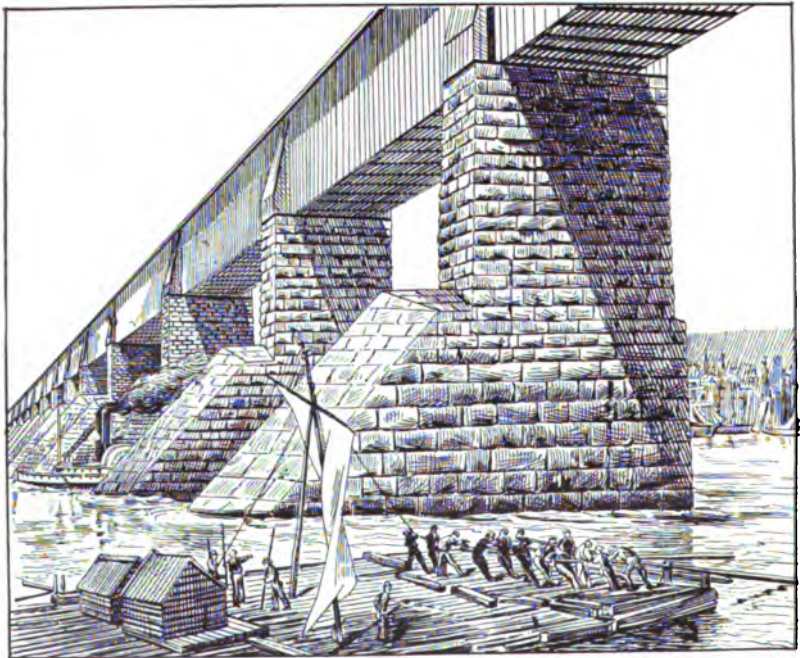
When a B. has to be erected, the question of what form it should be, falls to be settled by a variety of considerations. Regard to appearance affects the question, but the material points are its sufficiency for the purposes for which it is intended, and its security and durability. The nature of the embankments and of the soil in the water-bed, together with the nature of the water-shed, or country drained by the stream, may make it necessary that the B. should not be an arched bridge at all, but a suspension or cantilever bridge. But if it is to be an arched B., then the most important questions respect the number of its piers and the form of its arches. If vessels must be free to pass under it, the arches must be lofty, and the abutments high; so also must they be if the river is exposed to sudden elevations of its level by floods. Formerly a prejudice existed against laying a B. across a stream at any other angle than at right angles to its course. The reason was that the theory of the skewed arch (q.v.) being unknown, the obliquity of the B. to the water-course involved a corresponding obliquity of its piers to the water, which greatly increased the risk of the B. suffering from floods. But the skewed arch allows a B. to be thrown at any angle across a river, with its piers all parallel to the







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**BRIDGES.—1.** Cantilever bridge, St. John, N. B.    **2.** East River suspension bridge, N. Y.



idge, New York. 3. Victoria tubular bridge, Montreal. 4. 10. Bridge over the Kinzig, Baden.



stream; and many an awkward turn in our public roads would have been spared us had the skewed arch only been earlier known. See SKEW BRIDGE.

After making allowance for the requirements of position and traffic, the form next must be considered, more particularly in relation to the stream. The stream principally affects the form, through prescribing the number of piers. Each pier takes up so much of the water-course, and thus narrows the effective passage of the water. The immediate consequence of narrowing the channel is to increase the velocity of the stream. As the velocity of the stream increases, it tends more and more to carry off the soil in the neighborhood of the piers, and finally, by deepening its course, to undermine them. From this consideration, the effect of too many piers will be obvious; but indeed this is not matter of speculation, for many bridges—among others, a B. of Smeaton's at Hexham—have been destroyed from this cause, thus falling from the very overabundance of support! To know how many piers may with safety be used, the volume of water that flows through the channel, both ordinarily and in winter-floods, must be ascertained, which can be done very nearly by calculating the mean of many soundings taken at different states of the river, and at a succession of points across its bed. There is another way in which the stream affects the form. If it is liable to floods, care must be taken to make the piers so high as to elevate the spring of the arches above the highest level attainable by the water. In connection with this part of the subject, it must be remembered, too, that floods are apt to carry down trees and other floating masses, which, if the arches do not afford them passage, become powerful levers for the destruction of the bridge.

The form of the B. being determined on, the remaining questions relate to its stability. This depends on the strength of the abutments and piers, and the balanced equilibrium of the arches. The importance of securing proper foundations for the abutments and piers cannot be over-estimated, and very frequently their foundations, owing to the nature of the soil, have to be artificially constructed. See PILES, COFFER-DAM, and CONCRETE. In considering the stability of the B., the first thing is to ascertain the forces which will act to destroy it. This is ascertained by calculating the extreme passing load, and also the weight of the structure above the arches, and of the arches themselves. A scientific and skilled engineer is then able to judge what amount of strain or destructive pressure will be exercised by these weights on the several parts of the structure, and thus to adapt the strength at every point to the strain. As to the passing load, it is usual to calculate on 240 lbs. per foot, superficial, of the whole area in ordinary bridges, and on 960 lbs. in railway bridges. The weight of the superstructure and arches is a question for practical measurement. As to the remaining pressure—viz., that of the stream—it must be ascertained for the highest floods. It is calculated from knowing the mean velocity of the stream, and the amount of surface exposed to it. The surface is readily observed by means of floats; and when this is under 10 ft. per second, the mean velocity is found to be about one fifth less. The stress of the stream on the bridge is diminished by the expedient known as a cut-water, which is an angular projection from the pier. The best form for a cut-water has practically been ascertained to be an equilateral prism, presenting an angle of  $60^\circ$  to the water-course. In all bridges, these are to be found on the sides of the piers presented to the stream; and in tidal rivers, they are built on the lower side as well.

After the conditions already mentioned are satisfied, taste has more to do with the form of the arches than anything else. The forms in use are the old semicircular, the elliptical—usually got at by putting together several circular arches of different radii—and the segmental arch. The semicircular arch was almost exclusively used in the more ancient bridges. This arch is the most solid and most easily constructed, as all the voussoirs may be worked from the same mold. It requires, however, high banking, as its height is equal half its breadth; and where the water-level greatly changes, it is particularly unsuitable, from the great height necessary to be given to the piers, to carry the intrados out of water-reach. The elliptical arch and the segmental of  $60^\circ$  are, besides, far more pleasing in appearance.

In possible extent of span, the masonic bridge is far exceeded by suspension and girder bridges. At Chester there is a stone arch with a span of 200 ft.; in the Britannia tubular bridge the span is 460 ft.; in the suspension bridge over the Menai strait, 600 ft.; and in the suspension bridge at Freiburg, Switzerland, 870 feet. The railway bridge across the Tay, near Dundee, partially destroyed in 1879, was 8450 yards long. See TUBULAR BRIDGE and SUSPENSION BRIDGES; CANTILEVER BRIDGE.

The principal objections to the wooden B. is its liability to fire and to decay, besides which it is liable to warping, through the swelling and contracting of its beams. Although iron is fast superseding wood for bridge construction, a large proportion of American bridges is still to be found of the latter material. Wooden bridges are now assumed to have a life of but about 10 years.

English bridges are maintainable at the expense of the counties in which they are situated; but in many cities and boroughs, the inhabitants have acquired by prescription a liability for this expense, and by the 13 and 14 Vict. c. 64, the management and control of such bridges is given to the council of the city or borough. If part of a public bridge be within one county or other place on which the liability rests, and the other part of the bridge be within another, each party or body shall repair that part of the bridge which

is within its own boundaries. Besides the bridge itself, the county liable is bound by the 22 Henry VIII. c. 5, to repair 800 ft. of the road either way from the bridge. And such is still the state of the law as to all bridges built prior to the passing of the highway act, 5 and 6 Will. IV. c. 50. But by that act it is provided that, in the case of all bridges thereafter to be built, the repair of the road itself passing over or adjoining to a bridge, shall be done by the parish, or other parties bound to the general repair of the highway of which it forms a portion—the county being still subject, however, to its former obligation as regards “the walls, banks, or fences of the raised causeways, and raised approaches to any bridge, or the land arches thereof.” See Stephen’s *Com.*, vol. iii. p. 234. The neglect to make such repairs is treated in law books as a kind of negative offense; but there are positive offenses against bridges, which in the statutes are called nuisances, as to which, see the 43 Geo. III. c. 59. An act to amend the law in regard to the maintenance and management of roads and bridges in Scotland was passed in 1879, entitled “Roads and Bridges act.” Private bridges are those erected and maintained under contracts authorized by private acts of parliament.

We have already mentioned in the former part of this article some of the older American bridges. It remains now to describe the most important American bridge as regards construction—that over the East river between the cities of New York and Brooklyn, commonly known as the “Brooklyn Bridge.” The land approaches are of stone and brick in arches and piers, terminating at the river in the grand stone piers that rise 278 ft. above high-water. The following official account of dimensions and weight of materials is given: construction commenced Jan. 2, 1870; size of New York caisson, 172×102 ft.; size of Brooklyn caisson, 168×102 ft.; timber and iron in caisson, 5253 cubic yards; concrete in well-holes, chambers, etc., 5669 cubic ft.; weight of New York caisson, about 7000 tons; weight of concrete filling, about 8000 tons; New York tower contains 46,945 cubic yards of masonry; Brooklyn tower contains 88,214 cubic yards of masonry; length of river span 1595 ft. 6 in.; length of each land span, 930 ft.—1860 ft.; length of Brooklyn approach, 971 ft.; length of New York approach, 1562 ft. 6 in.; total length of bridge, 5989 ft., or 1.134 m.; width of bridge, 85 ft.; number of cables, 4; diameter of each cable, 15½ in.; first wire was run out May 20, 1877; cable-making really commenced June 11, 1877; length of each single wire in cables, 3578 ft. 6 in.; ultimate strength of each cable, 12,200 tons; weight of wire, 12 ft. per lb.; each cable contains 5296 parallel (not twisted) galvanized steel, oil-coated wires, closely wrapped to a solid cylinder 15½ in. in diameter; depth of Brooklyn tower foundation below high-water, 45 ft.; depth of New York tower foundation below high-water, 78 ft.; size of towers at high-water line, 140×59 ft.; size of towers at roof course, 136×53 ft.; total height of towers above high-water, 277 ft.; clear height of bridge in center of river span above high-water, at 90° Fah., 135 ft.; height of floor at towers above high-water, 119 ft. 3 in.; grade of roadway, 3½ ft. in 100 ft.; height of towers above roadway, 159 ft.; size of anchorages at base, 129×119 ft.; size of anchorages at top, 117×104 ft.; height of anchorages, 88 ft. front and 85 ft. rear; weight of each anchor plate, 23 tons; total cost of bridge, exclusive of land, \$14,627,379; total weight of suspended structure, 17,780 tons. Engineer, W. A. Roebling. The bridge was opened, ’83. 45,000 persons can cross hourly, supposing each to move at the rate of 200 ft. per minute, and 1440 vehicles.

Some other American bridges may be briefly described. One of the earliest of note is that over the Schuylkill at Philadelphia, which Fanny Kemble poetically described as “a scarf rounded by the wind and thrown over the river.” It was accidentally burned in 1838. The railroad bridge at Bellows Falls, built in 1850, has a span of 250 feet. The Susquehanna bridge (of the Wilmington and Baltimore railroad) is 3500 ft. long, with 13 piers and 2 guard piers at the draw. The spans are 250 ft. long, and the draw-span 176 feet. The Niagara Suspension Bridge has a span from center to center of towers of 821 ft., and is 245 ft. above the river. The bridge (suspension) over the Ohio between Cincinnati and Covington has a span of 1067 ft., and is 91 ft. above low-water. The Clifton bridge (over Niagara river just below the falls and above the suspension bridge) is 1190 ft. from bank to bank, and 1268 ft. between the points of suspension on the towers, and is 193 ft. above the water. The Victoria tubular bridge over the St. Lawrence at Montreal has a length of tube of 6600 ft., carried over 24 openings of 240 ft. each, and one of 330 ft.; with the approaches this bridge is 9084 ft. long. The Quincy Bridge over the Mississippi (draw) has 17 spans, two of 250 ft., three of 200, 11 of 137, and a draw-span of 360 feet. The bridge over the Missouri at Omaha is 2800 ft. long in 11 spans. The bridge of the New York Central railroad over the Hudson at Albany is 1740 ft. long, in 15 spans and a draw. But the most noteworthy of railroad bridges is that over the Mississippi at St. Louis. It is in three immense spans, those at the ends being 502 ft. each, and the middle one 520 feet. Over the railroad floor is a carriage and foot roadway 34 ft. wide between the foot-walks, which are each 8 ft. wide.

The terrible disaster of the fall of the Tay Bridge in Scotland, the centre portion of which went down in a furious gale on the night of the 27th Dec., 1879, justifies a brief description of that structure. It was the largest iron bridge in the world, crossing the river, or arm of the sea, a mile and a quarter w. of Dundee, with a length from shore to shore of 10,320 ft. (only 240 ft. less than two miles). Commencing at the s. or Fife shore there were three spans of 60 ft., two of 80 ft., 22 of 120 ft., 14 of 200 ft., 16 of 120 ft., 25 of 66 ft., one of 160 ft., and six of 27 ft.—in all 89 spans, the rails being 88 ft.



above the water. The portion which fell consisted of 12 spans somewhere near the middle of the bridge. A train of six passenger cars and the brakemen's van either went down with the bridge or ran into the vacancy in the dark, and not one person survived. There were over 90 lives lost.

The following statement comprises a list of the most important railway bridges and viaducts constructed by European and American railway companies. There are stone, wood, and iron structures, all of which appear under a separate head:

*Stone Bridges and Viaducts.*—Ballochmoyle viaduct, Glasgow, and S. W., width of span, 181 ft.; viaduct at Nogent, S. M., near Paris, 164 ft.; Durham Junction viaduct, 160 ft.; bridge near Wolmsdorf, Silesia, 150 ft.; bridge near Maidenhead, built by Brunel, 1835, 129 feet. There are three or four structures to be added to the foregoing, whose widths of openings exceed 100 feet. This includes the bridge at the Point-du-Jour, at Paris; the viaduct near Loebau, in Saxony, and the bridge at Point-de-Pille, on the line between Orleans and Bordeaux. The highest arches are principally found in Germany, and in the second line in various parts of France.

*Viaducts of Stone and Brick.*—Height of arch; over the Goeltz valley, in Saxony, 256 ft.; over the Elster valley, in Saxony, 223 ft.; over the Riofredo, in Austria, 197 ft.; at Diedenmuhle, near Chemnitz, Saxony, 170 ft.; at Chaumont, Paris to Mulhouse, 164 ft.; at Kalte Rinne, Semmering, Austria, 151 ft.; at Fure, near Grenoble, 185 ft.; at Comelle, near Creil, Paris, 131 ft.; at Wagnergraben, Semmering, Austria, 128 ft.; at Combe-Bouchard, Paris-Lyons railway, 128 feet. In addition to these there are several other bridges and viaducts whose height varies from 100 to 125 feet. Among the principal are the viaduct over the Tranz valley, in Austria; bridge across the river Fulda, near Kragenhof, Hanover; the Goel viaduct at Aix-la-Chapelle; viaduct at Mireville, on the line between Havre and Rouen; four more are in Saxon Switzerland; the rest in various parts of France. The longest viaducts and bridges are to be found in England; notably the viaduct on the line from London to Greenwich; the system of the South-western, South-eastern, Chatham and Dover, Great Eastern, and of other lines serving the metropolis. The next importance attaches to the bridge spanning the Lagoons and running into Venice, the bridge and viaduct over the river Elbe, at Dresden, and a few others.

*Timber-built Bridges and Viaducts.*—The most prominent structures are the following: Over the river Mista, on the Moscow and St. Petersburg railway, nine openings, each 200 ft. wide; over the river Elbe, at Wittenberg, with 14 openings, varying in width from 140 to 100 ft.; bridge near Woltenhofen, on the road from Lindau to Augsburg, Bavaria, one opening, 170 ft. wide; bridge near Kempten, on the same line as the foregoing, with five openings, varying in width from 85 to 140 ft. each. There are two wooden bridges on the North Shields, Newcastle line, one with seven, the other with five openings, the widest of which spans about 135 feet. The United States possess wooden bridges in very large numbers, and of much greater dimensions than are found on European roads. Among those noteworthy is the bridge over the Delaware river, on the Erie road, with two openings, each of a width of about 260 feet. The next structure of importance is a bridge over the Susquehanna river, near Columbia, with 29 openings, each about 200 ft. wide. There are two bridges crossing the Connecticut river, with spans of 174 feet. These are the most prominent bridges; but there are numerous other very remarkable structures, which, though of smaller dimensions, give evidence of great engineering skill.

*Iron Bridges and Viaducts.*—The following list comprises structures of this class of the greatest extent in length:

	Feet.
Parkersburg Bridge, West Virginia.....	7,045
St. Charles Bridge, Missouri.....	6,536
Over the river Ohio, near Louisville, Ky.....	5,310
Over the river Delaware, Pennsylvania.....	4,920
Over the East river, New York.....	5,989
Victoria Bridge, St. Lawrence river, Canada....	6,600
Over the river Rhine, at Mayence, Germany.....	3,380
Over the river Tongabudda, Bombay, Madras.....	3,730
Over the river Mississippi, near Quincy.....	3,200
Over the river Missouri, near Omaha.....	2,790
Over the river Vistula, near Dirschau, Germany....	2,750
Over the river Danube, near Stadlau, Austria.....	2,520
Over the river Po, near Mezzano-Corti, Italy.....	2,485
Over the river Tamar, near Saltash.....	2,190
Over the river Lek, near Kuilenburg.....	2,185
Over the river Mississippi, near Dubuque.....	1,758
Over the river Soral, in British India.....	1,745

The foregoing comprises a list of the longest bridges constructed of iron, but it does not include all the most important works from an engineering point of view. The bridges which have the widest or the most numerous openings are given in the subjoined list, and comprise all the great marvels which engineering skill and ingenuity have produced: Britannia bridge, Menai straits: four openings, two of 230 feet, and two

of 460 feet; built by Robert Stephenson and Fairbank, 1846-50. Conway bridge, Menai straits: one opening, 400 feet; built by Stephenson, 1847-48. Victoria bridge, crossing the St. Lawrence river at Montreal: one opening 830 ft., and 24 openings, each 240 feet; built by Stephenson. Bridge over the Garonne, near Langon, on the Bordeaux-Cette line: one opening of 245 ft., and two each of 210 feet. Over the Aire, near Brotherton: one opening of 225 feet. Over the Trent, near Gainsborough, on the Manchester, Sheffield and Lincoln line: two openings, each 150 ft. wide. Over the river Lek, a branch of the Rhine, near Kuilenburg, Holland: one opening of 150 ft., one of 80 ft., and seven of 57 feet; built 1868-70. Over the river Ohio, near Louisville, U. S.; one opening of 400 ft.; one of 370 ft.; six, each of 236 ft.; 14, varying in width from 210 ft. to 140 ft.; one of 100 ft., and two, each of 50 feet; built in 1868. Over the Vistula, near Dirschau, Berlin-Königsberg line—built 1850-57, by Lentze: six openings, 350 ft. each. Over the Waal, near Lommel, Belgium: three openings of 400 ft. each, and eight of 190 ft. each. Over the Rhine, near Griethausen: one opening of 380 ft., and 20 of 60 ft. each; built in 1863-64, by Monie. Over the Rhine, near Hamm: four openings, each of 330 feet; built in 1868-70, by Pichier. Over the Dieppe, near Moerdijk, Holland: 14 openings, each of 330 ft., and two of 51 feet. This structure resembles in a measure the unfortunate Tay bridge. It was completed in 1871. Over the Rhine, near Cologne: four openings of 320 ft. each; built, 1856-60, by Lohse and Wiedman. Over the Nogat, near Marienburg, Baltic: two openings of 312 ft. each. Over the Wye, near Chepstow: one opening of 300 ft., and three, each of 100 feet; built by Brunel, 1850-52. Over the Rhine, near Mannheim: three openings of 295 feet. Over the Boyne, near Drogheda: one opening of 270 ft., and two each of 140 feet; built by Barton, 1855. Over the Danube canal, near Vienna: one opening 260 ft. wide; built in 1860 by Koestlin. Over the Danube, near Stadlau, Austria: five openings each of 250 ft., and 10 each of 110 feet; built by Ruppert, 1868-70. Over the Trent, near Newark: one opening of 240 feet; built by Fox and Henderson, 1851. Over the Thames, Blackfriars: one opening of 205 ft., two of 195 ft., and two of 170 feet; built 1863-64. Over the Kinzig, near Offenbourg, Germany: one opening of 190 feet. Over the Elpel, Hungary: one opening of 185 ft., and three of 145 feet. Over the Rhine, near Strasburg: three openings of 185 feet. Over the Grau, in Hungary: one opening of 166 ft., and three of 144 ft. each, built by Ruppert, 1858. Over the Saar, near Frelburg; five openings, each of 160 ft., and two of 142 feet. Crumlin Viaduct, Newport-Abergavenny line: 10 openings each of 160 ft. width; built by Liddle and Gordon, 1853. Over the Lahn, near Coblenz: one opening, 150 ft. wide. Over the Thames, near Windsor: one opening of 200 feet; built by Brunel, 1849. Over the Weser, near Corvey, Germany: four openings, each of 185 feet; built by Schwedler, 1863-64. Over the Orne, near Caen, France: one opening of 145 feet. Built by Maier, 1858. On the Blackwall line: one opening, 120 feet. Over the Tamar, at Saltash: two openings of 450 ft., and 17 openings varying from 70 to 90 feet; built by Brunel. Over the Rhine, at Mayence: four openings, each of 335 ft., six of 115 ft., and 22 openings varying in width from 50 to 80 feet. Over the Isar, near Hesseloh, Germany: two openings, each of 170 ft., and two each of 85 feet. Over the Elbe, at Hamburg: seven openings, each of 335 ft., and three openings of 310 feet; built by Lohse, 1870. Over the Yssel, near Zutphen, Holland: one opening of 320 ft., and two of 55 feet. Over the Ohio, near Benwood, United States: one opening of 320 feet. Over the Mersey, near Runcorn, London and North-western railway: three openings of 300 ft. each. Over the Missouri, near Omaha, United States: 11 openings, each of 270 feet; built by Dodge, 1860-61. Over the Danube, near Manthausen, Austria: five openings of 260 ft., and two of 90 feet. Over the Danube, at Vienna, North-western line: four openings of 260 ft., and 14 openings of 95 feet; built by Hellwag and Gerlish, 1870-72.

The railway cantilever bridge over the Forth at Queensferry, completed in the year 1890, is the most remarkable application of the cantilever principle in the world. The breadth of the Forth at Queensferry is rather more than a mile; but, as the viaduct had to be continued overland on the n. shore for several hundred yards, the whole length of the bridge extends about one mile and one third. This, however, gives no fair idea of the breadth of span to which the physical conditions require the suspension principle to be applied. In the midst of the firth, but rather nearer to the northern than to the southern shore, rises the rocky islet of Inchgarvie. On either side of this island the bed of the river sinks to a depth which is impracticable for engineering purposes. On the n. side the bed sinks to a depth of 210 ft., on the s. side to 180 ft., below the water-mark; and it is there, for a breadth of 1600 ft. on either side, that no practicable bottom can be found for piers, and therefore that the suspension principle had perforce to be resorted to. Between the deep furrow on the s. side of Inchgarvie and the southern shore there is a reach of comparatively shallow water, with a maximum depth of 30 ft., but within which foundations may be found for some 12 or 15 piers. Viewed in profile from the bosom of the firth, the bridge thus presents to one's view five distinct sections. First, there is a shallow-water section on the s. side, covering some 2000 ft., and supported on 16 piers; then there is the deep-water section, s. of Inchgarvie, traversed by a suspension bridge; next there is the island of Inchgarvie itself, over which the viaduct was carried on two or three piers; then there is the deep-water section n. of Inchgarvie, spanned by a second suspension bridge; and, lastly, there is the northern shoreward section, which carries the

viaduct on 10 or 11 piers from the brink of the tide to the dead level of the Fife shore. The great features of the architectural design, as seen from the firth, are now the four pairs of lofty towers on which the massive steel chains which firmly support the two suspension bridges are hung, and next the two pairs of landward buttresses to which the suspending chains were anchored. Of the towers, two pairs now rise from the island of Inchgarvie, and attain the imposing height of 596 ft. Two pairs on the shore of n. Queensferry, and other two on the brink of deep water on the southern channel, attain to a full height of 584 feet. The two pairs of buttresses on the n. and the s. side respectively are, of course, less lofty; but they are also bold and striking masses of masonry. Those parts of the bridge, n. and s., which rest on piers, with a solid foundation bed consist of a single permanent way 25 ft. broad, and carrying a double set of rails. But the intervening portions carried by the suspension bridges consist of two distinct and parallel branches, each 15 ft. broad, each carrying a single line of rails, and 100 ft. apart. These branches are very tightly braced together; and this arrangement has been adopted in order to give greater breadth, and therefore greater stability, to the whole structure. Seen from above, the outline of the design has the appearance of a shuttle with elongated points. The divergence of the branches begins at the massive piers, two on each side, to which the suspension chains are anchored, and the maximum of divergence, 100 ft., was thus attained before the lofty towers were reached. While the bridge throughout the greater part of its extent makes necessarily a straight course, the shoreward part at either end forms a gentle curve. From each shore to the beginning of the suspension bridge the line rises with a gradient of 1 in 100. In the shoreward sections, and in that over Inchgarvie, the permanent way rests on the upper members of the lattice-girders; but in the two suspension sections it rests on the lower members. By this contrivance here, as in the case of the Tay bridge, the full height of 150 ft. above the high-water mark is confined to the central sections only. It will be evident that each of the deep-water channels n. and s. of the island of Inchgarvie has been spanned by a double suspension bridge. Each of these double bridges now consists of four parallel and enormous lattice-girders—two for each branch. These girders are 1600 ft. long. Seen in profile, their upper members form an arched outline, with a maximum height of 50 ft. and a minimum of 19 ft. besides the towers. On these towers, of course, their ends rest; but they derive their main support from four immense steel chains, one for each girder, which have been slung over the towers and fastened to the anchoring piers at either end. The girders are attached to the chains by stout wrought-iron rods at intervals of 50 ft. See adjoining illus.; also *ENGINEERING*, vol. V., and *RAILWAYS*.

**BRIDGE, MILITARY**, is a temporary construction, to facilitate the passage of rivers by troops, cannon, and military wagons. The most efficient are described under *Pontoon*; but there are many other kinds. A *bridge of boats* is formed by small-craft, especially cargo-boats, collected from various places up and down the river; trestles are placed in them to bring their tops to one common level; the boats are anchored across the river, and baulks of timber, resting on the trestles, form a continuous road from boat to boat across the whole breadth of the river; the boats ought to be of such size that, when fully laden, the gunwales or upper edges shall not be less than one foot above the water. *Rope-bridges* are sometimes but not frequently used by military engineers. A *boat-and-rope bridge* consists of cables resting on boats, and supporting a platform or road of stout timber. A *cask-bridge* consists of a series of timber-rafts resting on casks; the casks are grouped together in quadrangular masses; at certain intervals, timbers are laid upon them to form rafts, and several such rafts form a bridge; it is an inferior kind of pontoon-bridge. A *trestle-bridge* is sometimes made for crossing a small stream in a hilly country; it consists of trestles hastily made up in any rough materials that may be at hand, with planking or fascines to form a flooring, cables to keep the trestles in a straight line, and heavy stones to prevent them from floating. *Raft-bridges*, consisting of planks lashed together, are easily made of any rough materials that may be found on the spot; but they have little buoyancy, and are not very manageable. A *swing-flying bridge* consists of a bridge of boats, of which one end is moored in the center of the river, and the other end left loose; this loose end is brought to the proper side of the river, the boats are laden, and they make a semicircular sweep across the river by means of rudders and oars, until the loose end of the bridge reaches the other bank. A *trail-flying bridge* is a boat or raft, or a string of boats or rafts, which is drawn across a river by ropes, in a line marked out and limited by other ropes.

**BRIDGE, NATURAL.** See *NATURAL BRIDGE*.

**BRIDGE-BUILDING BROTHERHOODS** (Fr. *Frères pontifes*; Lat. *Fratres pontifices*) were religious societies that originated in the s. of France in the latter half of the 12th century. Their purpose was to establish hospices at the most frequented fords of large rivers, to keep up ferries, and to build bridges. The church during the middle ages regarded the making of streets and bridges as meritorious religious service. Whether or not the herdsman Benezet, subsequently canonized, was the founder or only a member of this fraternity, is as uncertain as the tradition which attributes to him the completion of the bridge over the Rhone at Avignon in 1180. The fraternity was sanctioned by pope Clemens III. in 1189; its internal organization was similar to that of the knightly



orders, and the members wore as their badge or insignia a pick-hammer on the breast. In France they labored very actively, but were absorbed into the order of St. John.

**BRIDGE-HEAD**, or **TÊTE-DU-PONT**, in military engineering, is a fortified post intended to defend the passage of a river over a bridge. It is a field-work, open at the gorge or in the rear, and having its two flanks on the banks of the river. The most favorable position is at a re-entering sinuosity of the river, where the guns can work better with the supporting batteries opposite. Bridge-heads are usually temporary works, hastily constructed. Their most frequent use is to aid a retiring army to cross the river in good order, and to check an enemy pressing upon it. Openings are left to allow the retiring army, with guns and carriages, to file through without confusion; and parapets are so disposed as to flank and defend these openings. See *illus.*, **FORTIFICATION**, vol. VI., fig. 48.

**BRIDGENORTH**, a t. of Salop or Shropshire, on both sides of the Severn, 20 m. s.e. of Shrewsbury. It consists of an upper and lower town, connected by a bridge over the Severn, which divides into two parts, known as the New Town and the High Town, of which the latter is on the right bank, and is built on a sandstone rock rising 60 ft. above the river. Pop. '91, 5723. It sent two members to parliament till 1868, and one member till 1885. The town, which was at one time called *Bruges* or *Brug*, is said to be of Saxon origin. In the beginning of the 12th c., Robert de Belesme defended the town unsuccessfully against Henry I. It was besieged in the same century by Henry II.; and during the civil wars it resisted the parliamentary forces for three weeks. A great portion of the town was on this occasion destroyed by fire. It has tanning, carpet and worsted industries, and a trade in agricultural produce. Bishop Percy was born here.

**BRIDGE OF SIGHS**, the covered passage which connects the doge's palace in Venice with the prison, over which prisoners of state were taken to confinement or to execution.

**BRIDGEPORT**, city, port of entry, and one of the seats of Fairfield co., Conn., on Bridgeport Harbor, an inlet of Long Island Sound, at the mouth of the Pequonnock River, 18 miles southwest of New Haven, 56 miles northeast of New York; lat. 41° 10' n.; long., 78° 11' w. The first settlement was made in 1670, and as Fairfield Village, Stratfield and Newfield successively, Bridgeport formed part of Fairfield, and in 1800 became the borough of Bridgeport; but was attached to Stratford until 1821. It was incorporated as a city in 1836, and in 1870 a part of Fairfield was annexed. West Stratford is practically a part of Bridgeport. The city is built mainly on level ground, and covers an area of 15 square miles. The most beautiful section, Golden Hill, has an elevation of 70 feet, affording fine views, and is covered with beautiful residences. The principal public buildings are the United States Post Office and Custom House, the Fairfield County Court House, the Barnum Memorial Institute, bequeathed to the Scientific and Historical Societies, and the Young Men's Christian Association Building. Bridgeport contains a well-endowed public library, an Historical Society, and a Scientific Society, which has an interesting collection of Indian relics. There are three fine parks. The most beautiful is Seaside Park, 100 acres in extent, situated on the shore, with a sea wall and drive two miles in length. It contains a Soldiers' Monument, and a statue of Elias Howe. The winter quarters of Barnum and Bailey's Circus occupy twelve acres. Bridgeport has numerous churches, several national banks, hospitals, an Orphan Asylum and Widows' Home, and daily, weekly, and monthly periodicals. There are high, graded, and training schools, and several private institutes. The city is supplied with water from the Pequonnock River, and is lighted by electricity. Black Rock, which forms part of Bridgeport, is a summer resort, and its harbor is a favorite one with yachtsmen. Bridgeport Harbor, including that of Black Rock, is landlocked and safe, and the channel is from nine to ten feet deep at low tide. Steamboats run daily to New York.

Bridgeport is an important manufacturing city. In 1890 there were 559 establishments, with an aggregate capital of \$19,786,572, employing 13,136 persons, and the value of the products was \$22,274,635. The principal articles manufactured are sewing-machines, carriages, brass, iron, copper, and steel goods, machinery, cartridges and plated ware. Some of the manufactories are of vast size. The Wheeler and Wilson Sewing Machine Works cover ten acres and the Union Metallic Cartridge Company has the largest establishment in its line in the world. The assessed value of property in 1895 was \$57,004,379. The population in 1810 was 1089; 1860, 13,299; 1870 (when a part of Fairfield was annexed), 18,969; 1880, 27,643; 1890, 48,860.

**BRIDGER'S PASS**, a defile in the Rocky mountains, in s. Wyoming, through which the overland stages went before the opening of the Pacific railroad. It is several miles long, and in most places has perpendicular side walls from 1000 to 2500 ft. high.

**BRIDGET**, SAINT (or, more properly, *Birgit* or *Brigitte*), a famous Roman Catholic saint, was b. in Sweden about the year 1302. Her father was a prince of the blood-royal of Sweden. When only sixteen, she married Ulf Gudmarson, prince of Nericia, a stripling of eighteen, by whom she had eight children, the youngest of whom, named Catherine (born in 1336, died in 1381), became *par excellence* the female saint of Sweden. Her husband and she now solemnly vowed to spend the remainder of their lives in a state of continence, and, to obtain strength to carry out their severe resolution, made a pilgrim-

age to the shrine of St. Jago de Compostella in Spain. On their return, Ulf died in 1344, and B. founded about the same time the monastery of Wadstena, in East Gothland. Sixty nuns and twenty-five monks were its first inmates. They received the rule of St. Augustine, to which St. B. herself added a few particulars. They constituted a new order, sometimes called the order of St. B., sometimes the order of St. Salvator, or the Holy Savior, which flourished in Sweden until the reformation, when it was suppressed, but it still possesses some establishments in Italy, Portugal, and elsewhere. Subsequently, St. B. went to Rome, where she founded a hospice for pilgrims and Swedish students, which was reorganized by Leo X. After having made a pilgrimage to Palestine, she died at Rome on her return, 23d July, 1373. Her bones were carried to Wadstena, and she herself was canonized in 1391 by pope Boniface IX. Her festival is on the 8th of October. The *Revelationes St. Brigittæ*, written by her confessors, was keenly attacked by the celebrated Gerson, but obtained the approval of the council of Basel, and has passed through many editions. Besides the *Revelationes*, there have been attributed to this saint a sermon on the Virgin, and five discourses on the passion of Jesus Christ, preceded by an introduction which was condemned by the congregation of the *Index*.

Not to be confounded with this Swedish saint is another St. Bridget, or St. Bride, as she is more commonly called, a native of Ireland, who flourished in the end of the 5th and beginning of the 6th c., and was renowned for her beauty. To escape the temptations to which this dangerous gift exposed her, as well as the offers of marriage with which she was annoyed, she prayed God to make her ugly. Her prayer was granted; and she retired from the world, founded the monastery of Kildare, and devoted herself to the education of young girls. Her day falls on the 1st of February. She was regarded as one of the three great saints of Ireland, the others being St. Patrick and St. Columba. She was held in great reverence in Scotland, and was regarded by the Douglasses as their tutelary saint.

**BRIDGETON**, city, port of entry, and co. seat of Cumberland co., N. J.; on the Cohansey River, and the Central of New Jersey and the West Jersey and Seashore railroads; 38 m. s. of Philadelphia. It was settled long before the revolution, but was not incorporated till 1864. Its chief manufactures are glass, gas pipes, nails, castings, machinery, lumber, flour, oil cloth, woolens, and canned fruits and vegetables. Among its educational advantages are the South Jersey Institute, the West Jersey Academy, Ivy Hall Seminary, Seven Gables Seminary, and a public high school. There are Tumbling Dam park of 100 acres, containing Sunset lake and athletic fields; numerous churches; electric lights and street railroads; good water and sewerage services; hotels; national banks; and daily, weekly, and monthly periodicals. The climate is excellent, and the surrounding region is exceedingly fertile and well cultivated. Pop. '90, 11,424.

**BRIDGETOWN**, the capital of Barbadoes (q.v.), is situated on the w. coast of the island along the n. side of Carlisle bay, which forms its roadstead, in lat. 13° 4' n., and long. 59° 37' w. Pop. 21,000. It was founded about the middle of the 17th c., taking the name Indian Bridge, and later its present appellation, from a rude aboriginal structure which spanned a neighboring creek. The present city, however, is only 130 years old, the former having been almost destroyed by fire in May, 1766. In 1831, a part of B. was destroyed by a hurricane, and in 1845 it again suffered severely from fire. It is the residence of the bishop of Barbadoes and of the governor-general of the Windward islands, and has a college, government buildings, town hall, water works, and jail. There is a considerable trade. A railroad 23 m. in length connects with the parish of St. Andrew.

**BRIDGEWATER**, a town in Plymouth co., Mass., 27 m. s. of Boston, on the New York, New Haven and Hartford railroad. It contains five villages, the state farm, a state normal school, a state almshouse, cotton mills, iron works, nail and tack mills, boot and shoe factories, brick works, public library, banking facilities, and weekly newspaper. Pop. '90, 4249.

**BRIDGEWATER**, a t. and port of Somersetshire, on both sides of the Parret (which is here spanned by an iron bridge), 6 m. in a direct line, and 12 by the river, from the Bristol channel, and 30 m. s.w. of Bristol. It stands on the border of a marshy plain, which lies between the Mendip and Quantock hills, but the country around is well wooded. It is chiefly built of brick. St. Mary's church has a remarkably slender and lofty spire. The Parret admits vessels of 200 tons up to the town; it rises 36 ft. at spring-tides, and is subject to a bore or perpendicular advancing wave, 6 or 8 ft. high, often causing much annoyance to shipping. Pop. in 1891, 12,429. B. formerly returned two members to parliament, but was disfranchised in 1870. Bath or scouring bricks, peculiar to B., are made here of a mixture of sand and clay found in the river. Admiral Blake was a native of this town, which suffered severely in the civil wars, when it was besieged by Fairfax, and ultimately forced to surrender, the castle being dismantled by the conqueror. The unfortunate duke of Monmouth was proclaimed king by the corporation of B., before the battle of Sedgemoor, which occurred in 1685, 5 m. s.e. of B., and in which he was defeated by the royal army.

**BRIDGEWATER**, FRANCIS EGERTON, Duke of, styled the "Father of British Inland

Navigation," youngest son of Scroop, fourth earl and first duke of B.; was b. in 1736, and succeeded his elder brother, second duke, in 1748. In 1758-60, he obtained acts of parliament for making a navigable canal from Worsley to Salford, Lancashire, and carrying it over the Mersey and Irwell Navigation at Barton by an aqueduct 30 ft. above the surface of the water, and 200 yds. long, thus forming a communication between his coal mines at Worsley and Manchester on one level. In this great undertaking he was aided by the skill of James Brindley (q.v.), the celebrated engineer, and expended large sums of money. He was also a liberal promoter of the Grand Trunk Navigation; and the impulse he thus gave to the internal navigation of England, led to the extension of the canal system throughout the kingdom. He died unmarried, Mar. 8, 1803.

**BRIDGEWATER, FRANCIS HENRY EGERTON**, Earl of, son of John Egerton, bishop of Durham, grandnephew of the first duke of B., b. 1758, succeeded his brother as eighth earl, in 1823. Educated for the church, he had previously been prebendary of Durham. He died unmarried, in Feb., 1829, and the title became extinct. By his last will, dated Feb. 25, 1825, he left £8000, invested in the public funds, to be paid to the author of the best treatise *On the Power, Wisdom and Goodness of God, as manifested in the Creation*, illustrating such work by such arguments as the variety and formation of God's creatures in the animal, vegetable and mineral kingdoms, the effect of digestion, the construction of the hand of man, and by discoveries, ancient and modern, in arts, sciences, and the whole extent of literature. The then president of the royal society of London, Davies Gilbert, to whom the selection of the author was left, with the advice of the archbishop of Canterbury, the bishop of London, and a noble friend of the deceased earl, judiciously resolved that, instead of being given to one man for one work, the money should be allotted to eight different persons for eight separate treatises, though all connected with the same primary theme (see next article).

**BRIDGEWATER TREATISES**, eight celebrated works "On the Power, Wisdom, and Goodness of God," by eight of the most eminent authors in their respective departments, published under a bequest of the last earl of B. (q.v.), whereby each received £1,000, with the copyright of his own treatise. They are: 1. *The Adaptation of External Nature to the Moral and Intellectual Constitution of Man*, by Thomas Chalmers, D.D. (Lond. 1833, 2 vols. 8vo). 2. *Chemistry, Meteorology, and the Function of Digestion, considered with Reference to Natural Theology*, by William Prout, M.D. (Lond. 1834, 8vo). 3. *On the History, Habits, and Instincts of Animals*, by the Rev. William Kirby (Lond. 1835, 2 vols. 8vo). 4. *On Geology and Mineralogy*, by the Rev. Dr. Buckland (Lond. 1837, 2 vols. 8vo). 5. *The Hand, its Mechanism and Vital Endowments, as Evincing Design*, by Sir Charles Bell (Lond. 1837, 8vo). 6. *The Adaptation of External Nature to the Physical Condition of Man*, by John Kidd, M.D. (Lond. 1837, 8vo). 7. *Astronomy and General Physics, considered with Reference to Natural Theology*, by the Rev. William Whewell (Lond. 1839, 8vo). 8. *Animal and Vegetable Physiology, considered with Reference to Natural Theology*, by Peter Mark Roget, M.D. (Lond. 1840, 2 vols. 8vo).

**BRIDGMAN, CHARLES DE WITT**, D.D., b. Saugerties, N. Y., 1835; graduated at Roch. Theol. sem., 1857; was pastor Bapt. church, Morristown, N. J., 1857-60; Bapt. church, Jamaica Plains, Mass., 1860-62; Pearl St. Bapt. church, Albany, N. Y., 1862-78; 1878-91, pastor of Madison Ave. Bapt. church, New York, resigning to enter the Protestant Episcopal church. He edited *Songs for the Lord's House*, 1882. Dr. B. is master of an attractive pulpit style, conveying rich and vigorous thought.

**BRIDGMAN, FREDERICK ARTHUR**, b. Alabama, 1847; figure painter. He was by profession an engraver, but exhibited some paintings in New York before 1866, and in that year went to Paris. He studied under Gérôme, receiving, 1877, a third-class medal for his "Funeral of a Mummy," exhibited in the *Salon*. "In the Harem" is another of his numerous works, nearly all of which represent Oriental scenes. He was elected a member of the National Academy of Design in 1881. His "Procession of the Bull Apis" is in Washington, D. C., and his "Roumanian Lady," in Philadelphia.

**BRIDGMAN, LAURA DEWEY**, a famous blind deaf-mute, was b. in Hanover, N. H., on the 21st Dec., 1829. She was a bright, intelligent child, but at two years of age was seized with a violent fever, which utterly destroyed sight, smell and hearing. For a time this so shattered her system, that there seemed no hope of recovery; but she rallied, and soon learned to find her way about the house and neighborhood, and even learned to sew and to knit a little. A strong passion for imitation began to develop itself, and by assiduously cultivating this power, she was at last enabled to emerge out of her life of unbroken darkness and silence, and take her place among the educated people of the day. In 1839, Dr. Howe of Boston undertook her care and education at the Perkins institute. The first attempt was to give her a knowledge of arbitrary signs, by which she could interchange thoughts with others. Then she learned to read embossed letters by the touch; next, embossed words were attached to different articles, and she learned to associate each word with its corresponding object. A pat on the head told her when she was right in her spelling lesson. Thus far, however, the work was only an exercise of imitation and memory, roused into exertion by the motive of love of approbation, but seemingly without intellectual perception of the relation between words and things. It was like teaching a clever dog a variety of tricks. But at last the truth flashed upon her, that by this means she could communicate to others a sign of what was passing in her own mind. Her whole being seemed changed. The next step was to procure a set

of metal types, with the letters cast at the ends, and a board with square holes for their insertion, so as to be read by the finger. In six months, she could write down the name of most common objects, and in two years had made great bodily and mental improvement. She grew happier, and enjoyed play like other children, amusing herself with imaginary dialogues, spelling old and new words, and with her left hand slapping the fingers of her right, if they spelled a word wrong; or giving herself a pat of approval, as the teacher did, when correct. Her touch grew in accuracy as its power increased; she learned to know people almost instantly by the touch alone. In a year or two more, she was able to receive lessons in geography, algebra, and history. She received and answered letters from all parts of the world, and was always employed, and therefore always happy. Her brain seems to have been unduly excited for a blind person; she not only held imaginary dialogues with herself, but dreamed incessantly by night; and during these dreams, while asleep, talked much on her fingers. She learned to write a fair, legible, square hand, and to read with great dexterity, and at last, even to think deeply, and to reason with good sense and discrimination, so that she was employed as a teacher, and was highly successful. She d. in 1889. See *Life and Education of Laura Dewey Bridgman* (Boston, 1878).

**BRIDLINGTON**, or **BURLINGTON**, a sea-coast t. in the East Riding of Yorkshire (including Bridlington Quay, a port and bathing-place about 1 m. to the s.e.), 6 m. w. of Flamborough head, and 40 m. e.n.e. of York. B. is situated on a gentle slope in a recess of a beautiful bay. The country is hilly to the n., but subsides to the s. into a flat alluvial and fertile tract called Holderness. It has the aspect of an old town with narrow irregular streets. Pop. in '91, 8916. It has a considerable trade in corn. Bridlington Quay is well known as a watering-place. B. is supposed to have been the site of a Roman station. The Danes had strongholds in this vicinity for nearly 300 years, and many engagements between them and the Saxons and Normans occurred here. Great numbers of ancient tumuli or barrows still exist. An Augustine priory of immense wealth, and which subsisted for 400 years, was founded here by a grand-nephew of the Conqueror, and obtained many privileges from Henry I., and also from king John. Some parts of it yet remain. In 1643, Henrietta, queen of Charles I., landed here with arms and ammunition from Holland bought with the crown-jewels. Bridlington Quay has a chalybeate mineral spring, as well as an intermitting one of pure water. B. is noted for its chalk-flint fossils. In the lacustrine deposits near B. were found, some years ago, the bones of a large extinct elk, with branching horns, measuring 11 ft. from tip to tip.

**BRIDPORT**, a t. in Dorsetshire, in a vale at the confluence of the Asker and the Birt, or Brit, or Bride, 16 m. w.n.w. of Dorchester, and 2 m. from the English channel. It stands on an eminence surrounded by hills, and consists chiefly of three spacious and airy streets. It has manufactures of ropes, cordage, sail-cloth, etc., and some foreign and coasting trade. It sent two members to parliament till 1867, and one till 1885. Population '91, 6611.

**BRIE**, an old district of France between the Seine and the Marne, Meaux being the chief town. B. was and is celebrated for its cheese and grain. In old times a forest covered a great portion of the region. It was subdued by the Franks, and was a part of the kingdom of Neustria. In the 9th c., it was ruled by its own counts, but in 1361 it passed to the crown. The district is now comprised in the departments of Aisne and those adjoining.

**BRIEF**, a concise and orderly statement of the points of law-pleadings and evidences to be laid by one party to a cause before a court at its trial. The word is used in England and in the United States with very widely differing meanings. In Great Britain it is the duty of the attorney or solicitor to prepare the case only—to draw up and serve papers, to marshal the evidence, to prepare the case for trial generally; while to the barrister is committed the task of arguing the case before the court, introducing the evidence, cross-examining, and taking entire conduct of the case in open court. A brief under this English practise is the concise statement of the case as it leaves the hands of the attorney, and it serves as a guide to the barrister and as his instructions for proceeding in open court. In the practise of courts in the United States one person serves the office of both the English attorney and barrister. In our courts, accordingly, the brief is the abbreviated statement of pleadings, affidavits, evidence and all points of law to be argued, prepared by the counsel for his own use or to lay before the court as an assistance in following his presentation of the case. In appellate courts of the states and in the United States courts the brief is the skeleton or analysis of argument prepared by counsel, setting forth the legal propositions he offers, citing cases in support thereof, and indicating the rulings for which he argues. It is usual, and indeed in some states it is required by law, that such a brief should be printed and furnished to the court, to the legal reporter, and to opposing counsel. The phrase *Brief of Title* is sometimes employed in place of the usual term *Abstract of Title*, to denote concise statement of the deeds, conveyances, and changes in ownership which may have occurred in the history of the title of a certain piece of real estate.

**BRIEF**, or **BREVE**, **PAPAL** (Lat. *brevis*, short), a word which, in the corrupt Latinity of the early ages, was made to signify a short letter written to one or more persons

(hence the German *brief*, a letter). It is now used to denote certain pontifical writings, which, however, do not receive their name from the brevity of the composition, but from the smallness of the caligraphy. The papal B. differs from the papal bull (q. v.) in several points. It gives decisions on matters of inferior importance, such as discipline, dispensations, release from vows, indulgences, etc., which do not necessarily require the deliberations of a conclave of cardinals. Still, it is not to be confounded with the *motus proprii*, or private epistle of the pope as an individual, as its contents are always of an official character. His holiness speaks, as it were, with a kind of familiar parental of authority, and the B. is consequently superscribed *papa*, while the person to whom it is addressed is termed *dilecte fili* (beloved son). It is signed not by the pope, but by the *segretario de' brevi*, an officer of the papal chancery, with red wax, and only with the pope's private seal, the fisherman's ring; hence it concludes *Datum Roma sub annulo piscatoris* (given at Rome under the ring of the fisherman). Like the bull, it is written on parchment, with this difference, that the bull is written on the rough side, and in ancient Gothic characters, while the brief is written on the smooth side, and in modern Roman characters.

**BRIEG**, a t. of Silesia, Prussia, about 27 m. s.e. of Breslau. It is situated on the left bank of the Oder, and on the railway between Breslau and Vienna, and is surrounded with walls, which have been partly converted into promenades. The streets are wide and regular, and commercially B. is a thriving town, its manufactures including linens, woollens, cottons, hosiery, ribbons, lace, leather, and tobacco. The battle-field of Mollwitz (q. v.) lies a little to the w. of Brieg. Pop. '80, 17,508; '90, 20,154.

**BRIEL, BRIEL'LE, or THE BRILL**, a fortified seaport t., on the n. side of the island of Voorne, s. Holland. It is situated near the mouth of the Maas, about 14 m. w. of Rotterdam, in lat. 51° 54' n., and long. 4° 10' east. B. possesses a good harbor, and is intersected by several canals. It has a pop. of about 5000, the male portion of which are chiefly engaged as pilots and fishermen. B. may be considered as the nucleus of the Dutch republic, having been taken from the Spaniards by William de la Marck, in 1572. This event was the first act of open hostility to Philip II., and paved the way to the complete liberation of the country from a foreign yoke. In 1585, B. was one of the towns made over to England as security for certain advances made to the states of Holland; it was restored to the Dutch in 1616. B. was the first town of Holland, which, without extraneous aid, expelled the French in 1813. The celebrated admirals De Witt and Van Tromp were natives of this place.

**BRIENNE-LE-CHATEAU**, or, as it is now called, **BRIENNE-NAPOLEON**, a small t. in the dep. of Aube, France, on the right bank of the river Aube, and about 14 m. n.w. of Bar-sur-Aube. It is celebrated as the place where Napoleon I. received his earliest military education, he having entered the school here in 1779, when he was 10 years old, and remained until 1784. It is also remarkable on account of the battle fought here between the French and the allies in 1814. On the 29th of Jan., Bonaparte, who had collected his forces in the vicinity of B., with a view to check the advance of the allies on Paris, attacked Blucher, who was stationed in the town, and drove him out with considerable loss. In the struggle, the town, which was chiefly composed of wood, was almost reduced to ashes. On the 30th, the contest was renewed, and Blucher was forced to retreat to Trannes. On the following day, Napoleon deployed his forces in the plain between La Rothière and Trannes, and on Feb. 1, the corps of the crown-prince of Würtemberg and count Giulay, and the Russian reserves of grenadiers, having joined Blucher, prince Schwarzenberg gave orders to renew the combat. After a sanguinary struggle, during which Napoleon, feeling the importance of the contest, exerted all his influence over his troops, led several charges in person, and frequently exposed himself to danger, victory at length declared decisively for the allies at every point. During the night of Feb. 1, and the morning of the following day, the French troops retreated from Brienne-le-Chateau. The loss on both sides was about equal, consisting of nearly 5000 killed and wounded. The allies took 9000 prisoners, and 70 pieces of artillery. This victory at B. opened the way to Paris, and led to the fall of the empire.

**BRIENZ**, a t. of the canton of Bern, Switzerland, beautifully situated at the foot of the Bernese Alps, on the n.e. shore of the lake of the same name, and about 30 m. e.s.e. of Bern. Its cheese is held in high repute. Pop. about 3000.—The lake of B., which is about 8 m. long and 2 in breadth, is formed by the river Aar, at the foot of the Hasli valley, and by the same river it discharges its surplus waters into lake Thun. The lake is situated at an elevation of 1850 ft. above the sea; its average depth is about 500 ft., but in some places it is said to have a depth of more than 2000 feet. It is surrounded by elevated mountains, the principal of which is the Rothorn, from which splendid views of the whole range of the Bernese Alps are obtained. A small steamer plies daily on the lake between B. and Interlaken, touching at the celebrated Giessbach fall every trip.

**BRIER CREEK**, a stream in Warren co., Ga., where, in the revolution, the Americans under Gen. Ashe were defeated Feb. 27, 1779, by the English under Gen. Prevost; American loss about 250; English loss, 16.

**BRIERLY HILL**, an ecclesiastical district of Staffordshire, England, 2 m. n.e. from Stourbridge, on the Oxford, Worcester, and Wolverhampton railway. It is a place of much activity, the district abounding in coal, iron, and fire-clay; and there are here numerous collieries, large iron-works, glass-works, brick-works, and potteries. The manufacture of steam-boilers is extensively carried on. Pop. '91, 11,831.

**BRIEUC**, Str., a seaport t., in the department of Côtes-du-Nord, France, situated on the right bank of the Gouet, about 2 m. from its mouth in the bay of St. B., a part of the English channel, in lat.  $48^{\circ} 31'$  n., and long.  $2^{\circ} 45'$  west. The town is said to owe its origin to an Irishman, St. Briec, who built a monastery here in the 5th century. St. B. has the ruins of an old tower that formerly defended the entrance to the river, but was partially blown up by order of Henri IV. in 1598, and a cathedral, part of which dates from the 11th century. Pop. '91, 16,941.

**BRIGADE**, in the military service, is a group of regiments or battalions combined into one body. Whenever an army takes the field, it is customary for three battalions to form a *brigade*, and two brigades a *division*. In the U. S. army, a brigade may consist of either cavalry, artillery, or infantry, under the command of a brigadier-general. Unlike the English brigade it is not a temporary grouping liable to be broken up at any time by the commander of the army. Two or more brigades form a division, and two or more divisions an army corps.

**BRIGADE MAJOR** is a military officer who exercises duties, in a brigade, analogous to those of the adjutant of a regiment. He attends to matters of discipline, and to the personal movements of the men. When regiments or battalions are brigaded, a B. M. is appointed, usually from among the captains. He conveys orders, keeps the rollster or roster, inspects guards and pickets, and directs exercises and evolutions; but he nevertheless remains on the books of a particular regiment, and returns to his regimental duties when the B. is broken up.

**BRIGADIER**, or **BRIGADIER-GENERAL**. In the English army usually a col. or lieutenant-col., who, for a limited time and for a special service, is placed upon brigade duties. He is then a general or commander of a brigade, which usually contains his own regiment as one of the number. In the U. S. army, an officer in command of a brigade. He is one degree higher than a col., and one degree lower than a maj.-gen. He is sometimes called simply brigadier.

**BRIGANDINE**, among the articles of armor worn during the middle ages, was an assemblage of small plates of iron, sewed upon quilted linen or leather, and covered with a similar substance to hide the glittering of the metal. It formed a sort of coat or tunic. The B. was named from the *brigans*, a kind of light-armed irregular corps, employed something like the Cossacks and Bashi-bazouks of recent days, and, like them, addicted to marauding and pilfering; hence the word *brigand*.

**BRIG—BRIG'ANTINE**. A brig is a square-rigged vessel with two masts. A brigantine, or hermaphrodite brig, is a two-masted vessel, with the mainmast of a schooner and the foremast of a brig. A brig's mainsail is the lowest squaresail on the mainmast, whereas the mainsail of a brigantine is a fore-and-aft sail like that of a schooner.

**BRIGGS, CHARLES AUGUSTUS**, D.D., b. 1841; graduated at Union theol. sem., New York, 1863; studied at Univ. of Berlin, Prussia, 1866-69; ordained (Presb.) 1870; pastor at Roselle, N. J., 1870-74; pub. *Biblical Study* (1883), a work of recognized importance in biblical criticism; *Whither* (1889); prof. of Hebrew and cognate languages in Union theological seminary, N. Y., 1874-91; prof. of Biblical theology in the same institution, 1891. His inaugural address on taking this chair, on *The Authority of the Holy Scriptures*, contained statements respecting the Bible, inspiration, and the place of reason in religion that were voted heretical by the Presbytery of New York, and at the General Assembly of the Presbyterian Church in May, a committee report disapproving his appointment was adopted by a vote of 440 to 60. His case was protracted through several years and occasioned much controversy in religious circles. In 1893 the General Assembly suspended him from the ministry, but the seminary refused to remove him. His later works include *The Higher Criticism of the Hexateuch* (1893); *The Messiah of the Gospels* (1894); *The Messiah of the Apostles and Biblical Study* (1895), etc.

**BRIGGS, CHARLES FREDERICK**, 1810-77; b. Mass.; a journalist and author known as "Harry Franco." He started the *Broadway Journal*, in New York, of which Edgar A. Poe became an associate editor the year following its establishment; and in 1853 he became the first editor of *Putnam's Magazine*, which he conducted for several years. At a later period he was connected with the *New York Times*. Some of his works are *The Adventures of Harry Franco*; *The Haunted Merchant*; and *The Trippings of Tom Pepper*.

**BRIGGS, HENRY**, a distinguished mathematician, was b. in 1561 at Warleywood, near Halifax, Yorkshire, and studied at St. John's college, Cambridge. In 1596 he was appointed first reader in geometry at Gresham house (afterwards college), London, and in 1619 first Savilian professor of geometry in Oxford. This office he retained till the time of his death, which took place at Oxford, Jan. 26, 1631. B. made an important contribution to the theory of logarithms, of which he constructed invaluable tables. Napier the inventor had, in 1614, published a table of the so-called natural logarithms, when B. observed that another system, in which the logarithm of 10 should be taken as unity, would afford great facilities of calculation. Napier admitted the improvement

on his own system, and intended to assist in carrying the plan into effect; but died in 1618, when the whole work was left to Briggs. In the same year he published his *Chilias Prima Logarithmorum*, containing the first thousand natural numbers calculated to eight decimal places, and in 1624 published his *Arithmetica Logarithmica*, the fruit of many years of unwearied application, and giving the logarithms of natural numbers from 1 to 20,000, and from 90,000 to 101,000, with 15 places. His system of logarithms is that now commonly adopted. Leaving others to carry out his calculations, for which he had provided every facility, he next employed himself on a table of logarithms of sines and tangents, carried to the hundredth part of a degree, and to 15 places, which, with a table of natural sines, tangents, and secants, was posthumously published at Gouda, in Holland, 1633, under the title of *Trigonometria Britannica*.

**BRIGHAM, AMARIAH**, 1798-1849; b. Mass.; a physician who devoted great attention to the cause and cure of insanity. He was superintendent of the retreat for the insane in Hartford, Conn., and of the New York state asylum. While at the latter institution he gave lectures and established the *Journal of Insanity*. Among his works are *Mental Cultivation and Excitement; The Influence of Religion upon the Health and Physical Welfare of Mankind; and The Anatomy, Physiology, and Pathology of the Brain*.

**BRIGHT, JESSE D.**, b. New York, 1812. Early in life he settled in Indiana as a lawyer, and became state senator and lieutenant-governor. In 1845, he was elected to the United States senate, where he served 17 years. In 1862, he was expelled from the senate for having written to Jefferson Davis as "President of the Confederate States," recommending to him a man who desired to furnish arms for the confederates. He d. 1875.

**BRIGHT, JOHN**, an English statesman, politician, first brought into notice by the anti-corn law agitation, son of Jacob Bright, a Quaker cotton spinner and manufacturer at Rochdale, Lancashire, was b. at Greenbank, near that town. Nov. 16, 1811. In 1835, he made a foreign tour, which included a journey to Palestine, and, on his return, delivered before a literary institution at Rochdale, of which he was one of the founders, lectures on the subject of his travels, and on topics connected with commerce and political economy. When the anti-corn-law league was formed in 1839, he was one of its leading members, and, with Mr. Cobden, engaged in an extensive free-trade agitation throughout the kingdom. In the spring of 1843, he offered himself as a candidate for the representation of Durham, and, though at first unsuccessful, he became in July of the same year, M.P. for that city. At all times an animated and effective speaker, B. was incessant, both at public meetings and in parliament, in his opposition to the corn laws, until they were finally repealed. In 1845, he obtained the appointment of a select committee of the house of commons on the game laws, and also one on the subject of cotton cultivation in India. An abridgment of the evidence taken before the former, published in one volume, contained from his pen an *Address to the Tenant Farmers of Great Britain* strongly condemning the existing game laws. At the general election of 1847, he was elected one of the members for Manchester. He co-operated with Mr. Cobden in the movement in favor of financial reform. On the formation of the first Derby ministry, Feb. 27, 1852, B. aided in the temporary reorganization of the corn-law league, in favor of the principles of free trade; and at the general election which followed, was re-elected for Manchester. A member of the peace society, and strenuously opposed to the war with Russia in 1854. B. was one of the meeting of the society of Friends, by whom a deputation was sent to the emperor Nicholas to urge upon him the maintenance of peace; and in 1855 he energetically denounced the Crimean war. A severe illness compelled him to withdraw for a time to the continent, and in his absence he was rejected by Manchester. Elected in 1857 for Birmingham, he seconded the motion against the second reading of the conspiracy bill, which led to the overthrow of lord Palmerston's government. His name then became chiefly associated with the movement for reforming the electoral representation, which resulted in the act of 1867. In 1868, he accepted office as president of the board of trade, but in 1870 was again obliged to retire, in consequence of severe illness. His health having been partially restored, he held office in 1873-74 as chancellor of the duchy of Lancaster, and again in 1881. In 1880 he was appointed lord rector of Glasgow univ. In 1882 he retired from the Gladstone ministry, being unable to support the government in its Egyptian policy. After that, his appearances were infrequent, but in 1883 he defended himself in the house of commons from a charge of breach of privilege in connection with speeches delivered at Birmingham. In 1880-88 he opposed the home rule policy of Gladstone. He d. Mar. 27, 1889. He was one of the most eloquent speakers of his time. A collection of his speeches was published in 1868; a *Life*, by Robertson (1877); his *Life and Speeches*, 2 vols., by G. Barnett Smith (1881); and his *Public Letters* (1885).

**BRIGHT, RICHARD**, 1789-1858; an English physician educated at Edinburgh, Berlin, and Vienna; from 1820 he was connected with Guy's hospital. He made many important medical observations (see **BRIGHT'S DISEASE**), and wrote numerous medical dissertations. His *Travels through Lower Hungary* (1818) contains a valuable account of the gypsies.

**BRIGHT, WILLIAM, D.D.**, educator; b. Doncaster, England, in 1824; educated at Rugby and University college; ordained in 1850; became canon of Christ Church and regius professor of ecclesiastical history at Oxford in 1868; edited a number of important theological works, and published many sermons, etc.

**BRIGHTENING**, in calico-printing, is the operation of rendering the colors of printed fabrics more bright or brilliant, by boiling them in solutions of soda and other materials.

**BRIGHTON**, originally Brighthelmstone, a t. and a celebrated watering-place on the sea-coast of Sussex, 50½ m. s. of London. It is built on a slope ascending eastward to a range of high chalk-cliffs (backed by the South Downs), bounding the coast as far as Beachy Head; to the west, these hills recede from the coast, and leave a long stretch of sands. Anciently, Brighthelmstone was a mere fishing-village on a level under the cliff; and more than once it was burnt and plundered by French marauders. It was fortified by Henry VIII., and more strongly by Elizabeth; but the sea proved more dangerous than the French, and now washes over the site of the village of those days. The inroads of the sea in 1699, 1708, and 1705, undermined many cliffs and destroyed many houses. Its further inroads are prevented by a sea-wall of great strength (60 ft. high, 28 ft. thick at the base, and 2 m. long), extending along the cliffs, and built at the cost of £100,000. The writings of Dr. Russel, a celebrated physician of George II.'s time, first drew public attention to B. as an eligible watering-place, and the discovery of a chalybeate spring in the vicinity increased its popularity. The visit of the prince of Wales in 1782, and his subsequent yearly residence there, finally opened the eyes of the fashionable world to its immense attractions, and B. thenceforth became the crowded resort of a health-seeking population. Its progress has been very rapid, and the town is still steadily increasing. B. is for the most part extremely well built, as becomes a favored retreat of wealth and aristocracy. It mostly consists of new and elegant streets, squares, and terraces. The hotels are magnificent. A range of splendid houses fronts the sea for nearly 3 m., including the famous sea-wall, and the beach is easily accessible by gaps in the chalk-cliffs. Formerly, trees were a great rarity in B.; but within the last thirty years they have been planted both in and around the town, and are now to be seen of considerable size in the North Steyne Inclosures, the Level, and the Queen's park. Pop. in 1801, 7339; in '51, 65,569; in '91, 115,402; est. '96, 120,499. B. returns two members to parliament. The population is greatly increased during the fashionable season by the influx of visitors. The town was incorporated in 1854. Near the center of the town is the pavilion, or marine palace, a fantastic oriental or Chinese structure, with domes, minarets, and pinnacles, and Moorish stables, begun for the prince of Wales in 1784 and finished in 1827. It is now the property of the corporation of B., and, with its fine pleasure-grounds of above seven acres, it is devoted to the recreation of the inhabitants. It stands in the Steyne, an open space between the e. and w. parts of the town. The marine parade, a fine terrace, extends about a mile along the margin of the cliff, between the Steyne and Kemp town, a handsome district on the east. Westward, there is a similar parade or promenade, extending a great length in front of the more modern part of the town, and here there is daily a large and fashionable concourse. There are two piers—a chain pier on the e., opposite the marine parade, and a broad wooden pier on piles on the w.; both are used for promenading. A magnificent aquarium, 715 ft. in length, was opened in 1872. B. has no maritime trade. It is reputedly a town for recreation and sea-bathing. Formerly there was a lack of trees to shade the promenades; the sea-breeze being adverse to the growth of trees. Races are held on the Downs, and formerly the volunteer reviews were held there, attracting many visitors each year. B. is connected with London, and also with the towns along the coast, by railways. From its salubrity, the town abounds in boarding-schools.

**BRIGHT'S DISEASE** (of the kidneys), so called after the English physician, Dr. Bright, who first investigated its character, consists of a degeneration of the tissues of the kidney into fat, and will be better understood after the anatomy of the organ has been studied. Suffice it to say now, that this degenerated condition impairs the excreting powers of the organ, so that the urea is not sufficiently separated from the blood. The flow of the latter, when charged with this urea, is retarded through the minute vessels, congestion ensues, and exudation of albumen and fibrin is the result. When we apply heat to the urine from a kidney so affected, it becomes opaque, showing that it contained *albumen* (q.v.); and on examining a drop of it under the microscope, we observe the exuded lymph mixed with epithelium in the form of casts of the small ducts of the diseased organ. The patient presents a flabby, bloodless look, is drowsy, and easily fatigued. The disease may succeed any of the eruptive fevers, and is frequently associated with enlargement of the heart.

The *causes* of this terrible malady are any which cause congestion of the kidneys—indulgence in strong drinks, long-continued suppuration, exposure to wet and cold, the *exanthematous* fevers, and pregnancy. The indications for *treatment* are, to remove any of those causes which may be present, rectify the other secretions, relieve any temporary congestion of the kidneys, at the same time endeavoring to increase the number of red blood globules by the administration of iron and vegetable bitters. And in the advanced



stages, when the blood is poisoning the nervous centers, attempts should be made to restore the secretion of urine by administering diuretics (q.v.), by giving hydrochloric and vegetable acids, sponging the patient with vinegar, and relieving the congestion of the brain by purgatives and local bleeding. See **ALBUMINURIA**.

**BRIGITTINES**, or **ORDER OF OUR SAVIOR**, founded in 1344, as a branch of the Augustinians, by St. Brigida or Brigitta, of Sweden. There were both monks and nuns who inhabited contiguous buildings, but were said never to see each other. Temporal affairs were supervised by the nuns; spiritual by the monks. The northern kingdoms of Europe had monasteries of this order, but the reformation swept them away. Henry V. founded one house near London; Henry VIII. suppressed it; Mary re-established it; and Elizabeth finally suppressed it. There are now no monks of the order. A few convents existed in 1860 in Bavaria, Poland, and elsewhere.

**BRIGNOLES**, a t. in the department of Var, France, beautifully situated in a fertile valley, surrounded by forest-clad hills, and watered by a stream called the Calami, about 22 m. w.s.w. of Draguignan. B., which is a very salubrious place, has manufactures of broadcloth, silk twist, soap, leather, pottery, etc.; and a trade in wines, brandy, olives, and prunes. Pop. '91, 4811.

**BRIGNOLI**, PASQUALE, 1820-84, b. Italy. After singing with much success in many of the principal opera houses in Europe he came to the United States in 1855, and for a quarter of a century was one of the most popular of operatic tenors. He acted in support of Mme. Patti when she first appeared there, and filled the same position with nearly every great singer who visited the United States.

**BRIHUEGA**, a t. of New Castile, Spain, 20 m. e.n.e. of Guadalajara, is situated on the Tajuña, and was formerly surrounded by walls, of which traces still exist. The remains of an old Moorish fortress now serve as a cemetery. B. has manufactures of woollens, linen, glass, and leather. Pop. 4000. Here, in 1710, during the war of the succession, the English general Stanhope, owing to the dilatoriness of his allies in affording him support, was defeated by the Duc de Vendôme, and compelled to surrender, with all his force, amounting to about 5500 men.

**BRIL**, the name of two Dutch painters.—**MATTIJS B.**, b. at Antwerp, 1550, went during his youth to Italy, and, under the patronage of pope Gregory XIII., painted several frescos in the Vatican. He was also distinguished as a historical and landscape painter. He died in 1584. His more celebrated younger brother, **PAUL B.**, b. 1554 or 1556, received instruction under Mattijs in Rome, and soon excelled his master. His pieces were at first conceived in the fantastic style which then prevailed; but gradually his style increased in power and beauty, until it exerted a striking influence over landscape-painting. The works of his riper age exhibit high poetical qualities, and a fine appreciation of the effects of light in the sky, which have been described as but little inferior to those of his great successor, Claude Lorraine. They have a character of solemn rest and calmness, and at times even an elegiac tone of melancholy, which well accords with representations of the glories of fallen Rome. A collection of excellent landscapes by B. is found in the palace Rospigliosi in Rome, and two beautiful landscapes enrich the gallery of the Pitti palace, Florence. Besides landscapes, B. painted scenes from Biblical history; among them, the "Tower of Babel," now in the Berlin museum. Other pictures by B. are found in the galleries of Munich, Vienna, and the Louvre. He died at Rome in 1626.

**BRILL**, *Rhombus vulgaris*, a fish of the same genus with the turbot (q.v.), found in considerable abundance on some parts of the British coasts, and common in the markets of the larger towns. It resembles the turbot more than any other British species of this genus, but is at once distinguished by its inferior breadth, which (excluding the fins) is only equal to half its entire length; by the want of tubercles on the upper surface; by a few of the most anterior rays of the dorsal fin being elongated beyond the membrane; and by the coloring, which is reddish sandy-brown on the upper side.

**BRILLAT-SAVARIN**, ANTHELME, 1755-1826; a French author, deputy in the states-general in 1789; judge of the court of cassation in 1792; the next year mayor of Bellay, but obliged to fly from the revolution. He went to New York, where he lived for three years, teaching French and playing in the orchestra of a theater. He returned to France in 1796, and under the consulate again became a judge. He wrote on political economy, and on the archæology of the department of Ain, but is best known by his *Physiology of Taste*.

**BRILLIANT** is a popular name given to the diamond when cut in a particular way. See **DIAMOND**.

**BRIKSTONE** (Saxon *brenno-stone*, a stone that burns) is the commercial name for sulphur (q.v.), in sticks or rolls.

**BRINDISI** (the ancient *Brundisium* or *Brundisium*), a seaport t. of southern Italy, in the province of Lecce, is situated on a small promontory in a bay of the Adriatic sea, about 45 m. e.n.e. of Taranto. B. is a city of very great antiquity. It was taken from

the Sallentines by the Romans 267 B.C., who some 20 years later established a colony here. The town, partly owing to the fertility of the country, but chiefly on account of its excellent port—consisting of an inner and outer harbor, the former perfectly landlocked, and capable of containing the largest fleets and of easy defense on account of its narrow entrance, and the latter also very well sheltered—rapidly increased in wealth and importance. It soon became the principal naval station of the Romans in the Adriatic. In 230 B.C., B. was the starting-place of the Roman troops that took part in the first Illyrian war; and from this point the Romans nearly always directed subsequent wars with Macedonia, Greece, and Asia. And when the Roman power had been firmly established beyond the Adriatic, B. became a city second to none in south Italy in commercial importance. Horace, who accompanied Mæcenas in a diplomatic expedition to B. in 40 B.C., has made the journey the subject of one of his satires (*Sat.* i. 5). Virgil died here in 19 B.C., on his return from Greece. The city appears to have retained its importance until the fall of the empire, but it suffered greatly in the wars which followed. When the Normans became possessed of it in the 11th c., the Crusaders made it their chief port for embarkation to the Holy Land; but with the decline of the crusades, B. sank into comparative insignificance as a naval station. The city subsequently suffered greatly from wars and earthquakes. The principal buildings are the cathedral, where the emperor Frederick II. was married to Yolanda in 1225; and the castle, commenced by Frederick II., and finished by Charles V. The district around B. is still remarkable for its fertility, olive oil being produced in large quantities. Some years ago, B. was constituted an entrepôt for foreign goods. Since the establishment of the overland route to India, B. has greatly increased in importance. Pop. 16,721.

**BRINDLEY, JAMES**, an eminent English mechanic and engineer, b. in Thornsett, near Chapelen-le-Firth, Derbyshire, in 1716. Apprenticed at 17 to a millwright, he afterwards became an engineer, and in 1752 showed great ingenuity in contriving a water-engine for draining a coal-mine. A silk-mill on a new plan, and several others of his works, recommended him to the duke of Bridgewater (q.v.), who employed him to execute the canal between Worsley and Manchester. Thenceforth he devoted his great skill and genius to the construction of navigable canals; commenced the Grand Trunk, and completed the Birmingham, Chesterfield, and others. Once, when under examination before a committee of the house of commons, being jocularly asked for what purpose he supposed rivers to have been created, he is said to have replied: "Undoubtedly to feed navigable canals." He died in 1772.

**BRINE** is the term applied to water highly impregnated with common salt, and **BRINE SPRINGS** are those natural waters containing much salt, which in many parts of the world gush out from fissures in the ground. See **SALT**.

**BRINE-SHRIMP**, *Artemia salina*, a small crustacean, of the order *branchiopoda* (q.v.), which, unlike the greater number of animals of that order, is an inhabitant not of fresh but of salt water, and is indeed remarkable, because it is to be found in myriads swimming about in the brine of salt-pans previous to boiling, when, having been concentrated by exposure to sun and air for about a fortnight, it destroys the life of almost all other marine animals. The full-grown B. is about half an inch long.

**BRINJAREE DOG**, a rough-haired or long-haired variety of greyhound (q.v.), used in the Deccan, and said to be the best of the hunting-dogs of India. It is said to be superior in size and strength to the Persian greyhound, but not to be equal to the British greyhound in swiftness. It is generally of a yellowish or tan color.

**BRINTON, DANIEL GARRISON, M.D., LL.D.**, archæologist and ethnologist; born at Thornbury, Pa., May 13th, 1837; educated at Yale, the Jefferson Medical College of Philadelphia, Paris, and Heidelberg. After serving in the army as a surgeon, he became editor of the *Medical and Surgical Reporter* (1867-87), Professor of Ethnology at the Philadelphia Academy of Natural Sciences, and of American Linguistics, Archæology in the University of Pennsylvania (1886), and president of the American Association for the Advancement of Science (1894). His chief works are *The Myths of the New World* (1868); *The Iroquois Book of Rites* (1883); *Races and Peoples* (1890); *The American Race* (1892); *A Primer of Mayan Hieroglyphics* (1896), etc. He is also the editor of the *Library of Aboriginal American Literature*.

**BRINVILLIERS, MARIE MARGUERITE**, Marquise de, notorious as a poisoner in the time of Louis XIV., was the daughter of Dreux d'Aubray, lieutenant of Paris, and received a careful education. In 1651, she was married, while still young, to the marquis de Brinwilliers. This nobleman seems to have been a gay and careless spendthrift, who allowed his wife to do very much as she pleased. He even introduced to her a young officer named Jean Baptiste de Gaudin, Seigneur de St. Croix, who was exceedingly handsome, and who inspired her with a violent passion. Her easy husband, however, was wholly indifferent to his wife's conduct; but her father, who seems to have had a stricter sense of duty, caused St. Croix to be arrested and imprisoned in the Bastille. It was here the latter learned the art of preparing poisons, from an Italian, and on his

release he imparted his fatal knowledge to his mistress, who, during his incarceration, had affected the greatest piety, spending most of her time in visiting the hospitals and in attending the sick. The marchioness now resolved to destroy her father. St. Croix eagerly abetted her, in the hope of obtaining a portion of the paternal inheritance; but in order to test the efficacy of the poison, she tried its effects upon the invalids of the *Hôtel Dieu*. Having satisfied herself, she commenced operations on her parent, surreptitiously giving him small doses of the poison for eight months, until her diabolical patience was exhausted, and she was at last induced to administer a very violent dose. He died, and no one suspected the marchioness. With St. Croix's assistance, and that of a domestic servant, Jean Amelin, *alias* Chaussée, she next poisoned with the same fearful indifference to crime, her two brothers and her sisters; her object being to find means of supporting her extravagant style of living with her paramour. Several times she attempted to poison the marquis, her husband; but he escaped, and, as was said, by means of antidotes given by St. Croix, who dreaded that he should be compelled to marry the widow. St. Croix died suddenly in 1672—his glass mask having fallen off while he was engaged in preparing a poison—leaving documents inculcating the marchioness. She was also accused about the same time by her accomplice Chaussée, who, being arrested, confessed all, and was condemned to be broken alive. The marchioness escaped to England; afterwards she traveled into Germany, and next went to Liège, where she took refuge in a convent. From this, however, she was craftily decoyed by an officer of justice disguised as an abbé, and conveyed to Paris. Among her papers was found a general confession of her crimes, including the above-mentioned murders, and many others. One strange confession stated that, out of pity for a virtuous young lady who had been imprisoned in a convent, the marchioness had poisoned a whole family! It is a singular fact, that this infamous woman was a bigot in her religious tenets, and was quite exemplary in her attendance at church. At her trial in Paris, she at first denied all charges brought against her, and pretended that the "general confession" had been written during the insanity caused by a fever; but after being put to the torture, she made a full confession, and was beheaded, July 16, 1676. Her career had excited such terror in France, that Louis XIV. instituted a distinct tribunal, the *chambre ardente* (q.v.), to investigate cases of poisoning by the "succession powder" used by the marchioness.

**BRIOCHE** (Fr.), a kind of cake, made with flour, eggs, and butter. The name is also given to a circular soft cushion, used as a foot-rest, as well as to a stitch in knitting, used in making this kind of foot-stool.

**BRION**, GUSTAVE, b. 1824; a French painter. Among his chief works are "The Potato Harvest during the Inundation," "A Funeral in the Vosges," "A Marriage in Alsace," and "The Sixth Day of Creation," the latter exhibited in New York. D. 1877.

**BRION**, LUIS, 1782-1821; an admiral in the Colombian service, who served in the army of Holland, studied navigation in the United States, and in 1811 was appointed captain of a frigate in the service of Caraccas.

**BRIOUDE**, a t. of France, in the department of Haute-Loire, situated near the left bank of the river Allier, about 29 m. n.w. of Le Puy. It occupies the site of *Brioc*, a town of the ancient Averni. Its principal buildings are the college and the church of St. Julien, founded in the 9th c., on the site of a still more ancient edifice erected on the spot where the saint was martyred. There is a well-known bridge at Vieille B. There are coal-mines near by. Lafayette was born here. Pop. '91, 4928.

**BRISBANE**. 1. B., an inland co. of Queensland, about 120 m. n.n.w. of Sydney.—2. B., a seaport, the capital of Queensland, about 640 m. n. of Sydney. It stands near the mouth of a river of its own name, which falls into Moreton bay. Regular steam communication is kept up with London and with Australian ports. B. possesses some fine buildings, among the chief of which are the houses of the legislature, which cost £100,000, the post-office, and the viceregal lodge. Several railroads terminate here. North and South B., two of its divisions, were connected by the Victoria iron bridge, 1080 feet in length, which was destroyed by flood in 1893. There are numerous churches, banks, and newspapers, four parks, a museum, a school of arts, a university, and a large export trade. Population in 1891, 48,738.

**BRISBANE**, General Sir THOMAS MACDOUGAL, a distinguished soldier and astronomer, was b. at Brisbane, the hereditary seat of his family, near Largs, Ayrshire, July 28, 1773. At the early age of 16 he entered the army as an ensign, and in the following year, when quartered in Ireland, he formed an intimate acquaintance with Arthur Wellesley, afterwards duke of Wellington. With a company he had raised in Glasgow in 1793, B. took part in all the engagements of the campaign in Flanders; and in the West Indies, to which he was sent in 1796, he greatly distinguished himself under sir Ralph Abercromby. He afterwards served in the West Indies as col. of the 69th; and in 1812 obtained command of a brigade under the duke of Wellington in Spain. For his conspicuous bravery at the battle of the Nive he received the thanks of parliament. When Napoleon abdicated, B. was sent in command of a brigade to North America, from whence he was recalled in 1815, but too late to admit of his being present at Waterloo. In 1821, B., on the recommendation of his friend the duke, was appointed governor of New South

Wales, a position he held for four years, during which time he introduced many wise reforms, especially in penal treatment; secured at his own expense good breeds of horses for the colony; promoted the cultivation of the sugar-cane, vine, tobacco, and cotton; and left at the close of his administration—which was marked by perfect tolerance and protection of all classes of Christians—50,000 acres of cleared land where he had found only 25,000. But high as B. ranks as a soldier and administrator, as a man of science he holds a still higher place. While in Australia, he catalogued no less than 7865 stars, for which great work—known as “the Brisbane Catalogue of Stars”—he received the Copley medal from the Royal Society. On his return to Scotland, he had an astronomical observatory established at his residence at Makerstoun, and devoted himself entirely to scientific pursuits. He entered warmly into the plans of the British Association for ascertaining the laws of the earth's magnetism, and in 1841 had a splendid magnetic observatory erected at Makerstoun, the observations made there filling three large volumes. D. 1860.

**BRISCOE**, a co. in the “Panhandle” of Texas; formed 1876, and organized 1892, drained by head-waters of Red river; 900 sq. m. Pop. '80, 12; '90, not reported. Co. seat, Silvertown.

**BRISKET** is the breast of an animal, the part of an animal that lies next to the ribs, and immediately covering the breast bone; also a joint of meat.

**BRISSON**, EUGÈNE HENRI, b. Bourges, France, 1885; studied law at Paris, where he started a republican journal called *L'Avenir*. He was elected to the national assembly as a Republican in 1871; became president of the chamber of deputies in 1881, 1894, and 1897; and in the election for president of the republic, to succeed M. Casimir-Perier, Jan. 17, 1895, he received 361 votes to 480 for Francis Félix Faure.

**BRISNOT**, JEAN PIERRE, one of the first movers in the outbreak of the French revolution, and afterwards numbered among its victims, was b. at Chartres, in 1754, and educated for the bar. After completing his studies at Paris, he went into the office of a procurator, but quickly abandoned the legal profession for the more congenial one of authorship. From his earliest years he had devoted himself with passionate eagerness to literary studies, especially history, economics, and politics, and, among the other lingual accomplishments, acquired a thorough mastery of English. His first work, *Théorie des Lois Criminelles* (1780), gained the approbation of Voltaire and D'Alembert, and was followed by his *Bibliothèque des Lois Criminelles*, which established his reputation as a jurist. Having removed to London, he there started a learned journal, under the title *Lyceum*, for which, however, he found no adequate support. He therefore returned to Paris, and soon afterwards was imprisoned in the Bastille, on a charge of having written against the queen a brochure, which, in fact, was penned by the marquis de Pelleport. After four months in the Bastille, he was liberated through the intervention of Madame de Genlis and the duke of Orleans. B. continued to write tracts on finance, etc., but his love of freedom and vehement hatred of despotism again involved him in danger, and, to escape from a *lettre-de-cachet*, he was once more compelled to retire to England. He afterwards visited North America, as representative of the *Société des Amis des Noirs*. On his return to France, he zealously assisted in the outbreak of the revolution, and was in consequence elected by the citizens of Paris their representative in the constituent assembly, where he exercised a predominant influence over all the early movements of the revolution. He also established a journal, called *Le Patriote Français*, which became the recognized organ of the earliest republicans; and, through his superior knowledge of politics and the usages of constitutional countries, he gathered round him all the young men of talent and spirit who were opposed to the court-theory of absolute sovereignty. It thus happened that, without his being formally considered the head of a party, all the movements of the early revolutionists were profoundly influenced by him, and he incurred the bitter hatred of the court reactionists, who affixed the nickname of Brissotins to all the advocates of reform. Afterwards, the Brissotins formed the Girondist party. In the convention, B. was representative of the department Eure-et-Loir. Here his moderation made him suspected as a friend of royalty, as he opposed the “men of September” and the trial and condemnation of the king. When Louis XVI. heard his doom pronounced, he exclaimed: “I believed that Brissot would have saved me!” But B. was weak enough to imagine that the best way to save the king would be to vote first for his death, and then appeal to the nation. B. and his party, which was perhaps the purest in principle and the weakest in action, ultimately fell before the fierce accusations of the Mountain, or Jacobin party, which believed, or at least pretended to believe, that the virtuous B. had received money from the court to employ against the revolution. With 20 other Girondists, B. suffered death under the guillotine, Oct. 30, 1793.

**BRISTED**, CHARLES ASTOR, son of the Rev. John Bristed, grandson of John Jacob Astor, b. N. Y., 1820. He was educated at Yale and at Trinity college, Cambridge, Eng., graduating in 1845. For several years he was a contributor to periodical literature over the signature of “Carl Benson.” He was one of the first board of trustees of the Astor library. Among his collected works are: *The Upper Ten Thousand of New York*; *Selections from Catullus*; *Five Years in an English University*; *The Interference Theory of the Government*; and *Letter to Horace Mann*, in which he replied to attacks upon John Jacob Astor and Stephen Girard. He d. 1874.

**BRISTLES**, the strong hairs growing on the back of the hog and wild boar, and extensively used in the manufacture of brushes, and also by shoemakers and saddlers. They form an important article of British import, between 2 and 3 million pounds being annually imported, chiefly from Russia and Germany; but they are also obtained from France and Belgium, and small quantities of inferior quality have recently been received from China. From Russia, the average annual value of B. imported into Britain is £300,000, Siberia alone supplying about £150,000. Russian B. vary in value from \$30 to \$300 per cwt. From Germany about \$500,000 worth per annum is exported, varying from \$30 per cwt. to \$175 per cwt. From France and Belgium, about \$100,000, varying in value from 50c. to about \$1.12 per pound. The quality of B. depends on the length, stiffness, color, and straightness—white being the most valuable. The best bristles are produced by pigs that inhabit cold countries. The Russian hog is a long, spare animal, and the thinner the hog, the longer and stiffer the bristles. When the Russian hog is sent to the south and fattened, the B. become soft, and of course depreciated in value. In the summer, the hogs are driven in herds through the forests, to feed on soft roots, etc., when they shed their B. by rubbing themselves against the trees. The B. are then collected, sewed up in horse or ox hides, and sent to fairs, whence they find their way, through agents, to all countries.

**BRISTOL**, a co. in s.e. Mass., bordering on Rhode Island and the ocean, 557 sq. m.; pop. '75, 131,087; in '90, 188,465. It is drained by Pawtucket and Taunton rivers, and has nearly 20 m. of sea-coast. There is considerable agriculture, but the main business is manufacturing of cotton, wool, etc. There are five railroads intersecting the various parts of the county. Co. seats, Taunton and New Bedford.

**BRISTOL**, a co. in e. Rhode Island, bordering on Mass.; 25 sq. m.; pop. '90, 11,428. It has an uneven surface, with some fine scenery and fertile soil. Two railroads traverse its territory. Co. seat, Bristol.

**BRISTOL**, a town in Hartford co., Conn., on the New England railroad, 18 m. w.s.w. of Hartford. It has electric lights, banking facilities, high school, Y. M. C. A., and library, and weekly newspapers, and manufactories of clocks, brass goods, table ware, knit goods, tools, etc. The town was originally a part of Farmington. Pop. '90, 7382.

**BRISTOL**, a borough in Bucks co., Penn., on the Delaware river, the Pennsylvania canal, and the Pennsylvania railroad; 21 m. n.e. of Philadelphia, opposite Burlington, N. J. It has foundry and rolling mills, carpet factory, and hosiery, worsted, and yarn mills; banking facilities, high school, electric lights, weekly newspapers; and a well-known mineral spring. Pop. '90, 6553.

**BRISTOL**, a town, port of entry and co. seat of Bristol co., R. I.; on the Narraganset Bay and the New York, New Haven and Hartford railroad; 15 miles s.e. of Providence. It was incorporated in 1746 and a portion of it was annexed to Warren in 1873. The town is the site of the residence of King Philip, the great Narraganset chief; it has an excellent harbor; and the principal industries are boatbuilding and the manufacture of rubber, woolen and cotton goods. Pop. '90, 5478.

**BRISTOL**, an important maritime city in the w. of England, long. 2° 35' 28" w., lat. 51° 27' 6" n. situated at the junction of the rivers Frome and Avon, and partly in the counties of Gloucestershire and Somerset. It is six miles from the mouth of the Avon. Since the year 1373 it has formed a county by itself. Among the ancient buildings may be mentioned the cathedral, formerly an Augustinian church (1148). A part of it was pulled down in the 15th century, but has been rebuilt (1877); the choir dates from the 14th century, and the Norman chapter-house and gateway are still standing. Some remains still exist of the ancient castle, built probably by Geoffrey, bishop of Coutances, and improved by Robert, earl of Gloucester, in the early part of the 12th century. St. James's church is a good specimen of Norman architecture, and other noted churches are St. Philip's, St. Jacob's, St. Stephen's, All Saints, the Mayor's Chapel, and the Temple church, but more famous than these, perhaps, is the church of St. Mary Redcliffe, whose spire was completed in 1872. The modern portions of B., including Clifton, Cotham, Redland, etc., consist of handsome residences in squares, terraces, crescents, and detached villas, and some excellent specimens of architecture in churches, chapels, assembly and club rooms. The floating harbor and quays are very extensive and are formed by embanking and locking the old courses of the rivers, which now flow through a new channel. The city is one of the most important ports in Great Britain, and its trade is of long standing. In the records of the 14th century it is mentioned as having a large trade in cloths, leather, wine, and salt, and was one of the "staple towns." It was prominent in the early commercial ventures and in discovery. It was the port from which John Cabot sailed, the discoverer of North America, and his son Sebastian Cabot is said to have been born here. Bristol traders colonized Newfoundland and engaged largely in the commerce with the West Indies and the American colonies. In the 18th century it was famous for its privateering. Shipbuilding has been a prominent industry there for many years. The *Great Western*, the pioneer of steam-communication across the Atlantic, was built at Bristol in 1838. The dock accommodations are extensive, and in 1893 the municipal incorporation purchased large docks at Avonmouth and Portis-

head. The principal imports are oils, hides, petroleum, grain, tallow, and sugar; the exports are iron, copper, tinplates, coal, salt, cotton goods, earthenware, chemicals, and other manufactured products. The total tonnage entered and cleared at the port in the year 1895 was 948,867. Bristol returned two members to parliament until 1885, when the number was increased to four. The municipal government is vested in a mayor, a board of aldermen, town-councillors, a lord-lieutenant, and a lord high steward. The police arrangements are efficient, and the city has a large jail. The benevolent institutions of B. are numerous and well supported. Among them are hospitals; asylums for the blind, deaf mutes, orphans; almshouses, reformatories, etc. Besides many free schools and institutions for secondary education, the city has a university and Clifton College. The number of students attending the former in the year 1896 was 496, and the faculty numbered 47. It contains numerous places of worship belonging to all denominations. Bristol received its charter from Henry II. in 1171. Edward III. gave it the rights of a county in 1247. The parishes of Redcliffe, Temple, and St. Thomas were added. During the civil wars it was alternately taken by royalists and parliamentarians, and by the latter the castle and fortifications were razed. It afterwards became the principal port of trade with the West Indies, and carried on a flourishing business in negro slaves. In 1793 the "bridge riots" occurred. In 1831 the "reform bill riots" resulted in the destruction of the bishop's palace, custom-house, excise-office, jail, toll-houses, a number of private residences, and several lives. The Reform Bill itself gave the city its present municipal boundaries. Many noted names are identified with the history of the city; among them are William of Worcester; Canynge, the great merchant, and restorer of Redcliffe church; the poets, Southey and Chatterton; the artists Lawrence and Baily; Sydney Smith, canon of Bristol cathedral; Robert Hall, Coleridge, Hannah More, and the Misses Porter. The population of Bristol proper was, in 1871, 62,662, and of the suburban districts, 141,378—total, 204,040. In 1896 the population included in the municipal borough was estimated at 230,623.

**BRISTOL BAY**, an arm of the Pacific ocean, or Bering sea, lying immediately to the n. of the peninsula of Alaska. B. B. receives the waters of two considerable lakes, which, communicating with each other, offer an opening into the interior.

**BRISTOL BOARD**, a thick stiff paper for drawing, made with a smooth and sometimes with a glazed surface. It was first made at Bristol, Eng.

**BRISTOL BRICK**, or **BATH BRICK**, formerly made only in Bristol, Eng., but now made in New Hampshire and other parts of the United States. It is composed of fine-grit sand, and used mainly for cleaning and polishing steel surfaces.

**BRISTOL CHANNEL**, an inlet of the Atlantic ocean, in the s.w. of England, between South Wales on the n., and Devon and Somerset shires on the s.; or it may be regarded as an extension of the estuary of the river Severn. It is about 80 m. long and 5 to 48 m. broad, the greatest breadth being between St. Gowan's head and Hartland point, its most western and external points, this line passing through Lundy isle. It is the largest inlet or estuary in Britain, having a very irregular coast-line of 220 m., and receiving a drainage of 11,000 sq. miles. The chief rivers which flow into it are the Towy, Taff, Usk, Wye, Severn, Avon, Axe, Parrot, Taw, and Torridge. The tides in it rise to an extraordinary height—at Bristol, 35 ft.; at King's road, 40; and at Chepstow sometimes 70. The rapid flow of the tides meeting the currents of the rivers produces, in the narrow parts of the channel, and in the mouths of one or two of the rivers which enter it, the phenomenon of the *bore*, the tide advancing like a wall of water, sometimes 6 to 9 ft. high.

**BRISTOW, BENJAMIN HELM**, b. Ky., 1832; practiced law until the commencement of the civil war, when he volunteered and served in the union army, rising to col. He was appointed United States solicitor-general in 1870, but was not confirmed; attorney-general in 1873, and secretary of treasury in 1874. In the last office he was active in the prosecution of the "Whisky ring." He began practicing law in New York city in 1876, and d. there in 1896.

**BRISTOW STATION**, a village in Virginia, 4 m. s.w.s. of Manassas Junction, where two engagements took place during the civil war—one Aug. 27, 1862, closed by darkness, and indecisive; and one Oct. 14, 1863, when the Confederates, who made the attack, were repulsed.

**BRIT**, *Clupea minima* (Peck), a species of herring, very small, found in great abundance at certain seasons off the New England coast, where it serves as food for bluefish. It is seldom more than 3 in. long, and is of no importance for the table.

**BRITAIN, GREAT**. See **GREAT BRITAIN**.

**BRITAIN, NEW**. See **NEW BRITAIN**.

**BRITANNIA** (perhaps from Celtic *brith* or *brî*, painted, the ancient Britons being in the habit of painting their bodies blue with woad), the ancient name of the island of Great Britain (see **BRITANNICÆ INSULÆ**). The Romans under Julius Cæsar (who wished to chastise the Britons for aiding the Veneti, a tribe in Gaul, against the Roman power) invaded Britain in 55 and 54 B.C., but they did not, for a hundred years afterwards, proceed with vigor to subdue the country. After a desperate resistance by the native

British princes, especially Caractacus and Boadicea, the s. half of Britain was conquered by Vespasian, and made a Roman province in the reign of Claudius, about 50 A.D. Agricola, sent by Nero in 79 A.D., consolidated these conquests, and extended the influence of Rome to the firths of Forth and Clyde, between which, in 84 A.D., he erected a chain of forts to repel the inroads of the northern Caledonians, in the line of the stone wall of Antoninus, afterwards erected, in 140 A.D., by Lollius Urbicus. Agricola was the first Roman to sail round the island, and the first Roman general to come in contact with the Caledonians, whom, under their leader Galgacus, he overthrew, in 84 A.D., at a hill called the Mons Grampius, the situation of which has not been satisfactorily determined. The Romans made many ineffectual attempts to subdue the Caledonian barbarians, and penetrated, for this purpose, through the n.e. part of Scotland as far as the Moray firth, as is attested by the remains of Roman camps and stations still existing along their line of march, and the relics of Roman art found in connection with them. Not only did the Caledonians on their own soil resist the Roman sway, but by constant inroads into the Roman territory s. of the wall of Antoninus, they so harassed the Romans themselves, that the latter were forced to abandon their conquests for 80 m. s. of that wall, and to secure permanently their remaining conquests in South Britain by a line of defensive works between the mouth of the Tyne and the Solway firth, called the wall of Hadrian (q.v.), begun by Agricola, in 80 A.D., strengthened by Hadrian in 121, and rebuilt and completed by Severus in 210 A.D. After this last date the Romans did not attempt to regain their lost provinces. Subject to these incursions of the Caledonians, the opposition of the native British princes, and the invasion of tribes from the opposite shores of the continent, the Romans held sway in Britain down to about 420 A.D., soon after which time the Saxons invaded s. Britain, and ultimately subdued it. Britain, s. of the Solway firth and the mouth of the Tyne, in the reign of Claudius, formed one Roman province under a consular legatus and a procurator. Ptolemy mentions 17 native tribes as inhabiting this tract. Toward the close of the 4th c. A.D., Roman Britain constituted a diocese in the prefecture of Gaul, and was divided into five provinces, of which the boundaries, though uncertain, are supposed to have been as follows: B. Prima, England s. of the Thames and the Bristol channel; B. Secunda, Wales; Flavia Cesariensis, the country between the Thames, Severn, Mersey, and Humber; Maxima Cesariensis, the rest of England to the Scottish border; and Valentia—soon abandoned by the Romans—or Scotland s. of the wall of Antoninus. At this time, also, the inhabitants of Roman Britain included Phenician, Roman, and Germanic elements, which had become incorporated with the native Britons, who were of Celtic or Gaelic descent. The Romans governed Britain by a vicarius or vicegerent resident at Eboracum (York), under whom were consulars, presidents, and other subordinate officers. To insure the obedience of the natives, at least three Roman legions—chiefly composed of Gauls, Germans, Iberians, and but few pure Romans—were stationed in Britain; viz., at Eboracum, Deva (Chester), and Ica Damnoniorum (Exeter). Under the Romans, many towns (colonie and municipia)—56 are enumerated by Ptolemy—arose in Britain, and diffused Roman law and civilization over the country. The towns of Eboracum (York) and Verulamium (near St. Albans) had the privileges of Roman citizenship. The Romans made many roads or streets (*strata*), of which there are still numerous remains, across the country, all centering in London. They also developed it into a corn-growing country. Druidism was the religion of the Britons at their conquest by the Romans, but the latter introduced Christianity and Roman literature into the country. There are many remains still extant of the presence of the Romans in Britain, such as camps, roads, ruins of houses, baths, flues, altars, mosaic pavements, painted walls, metallic implements and ornaments, weapons, tools, utensils, pottery, coins, sculptures, bronzes, inscriptions, etc. These remains show that the Romans wished to render their British conquests permanent, and that they had greatly improved the arts of the ancient Britons, as is evident on comparing the remains with the far ruder native antiquities of the British pre-Roman or prehistoric era, such as tumuli, barrows, earth-works, so-called Druidical monoliths and circles, cronelechs, cairns, pottery, weapons, tools, utensils, ornaments, etc. Many of the Roman remains in Britain also show that the Romans had introduced into the country the refinements and luxuries of Rome itself.

Under the term BRITANNIA, Great Britain has been personified in the fine arts as a female seated on a globe or on an insulated rock, and leaning with one arm on a shield, the other hand grasping a spear or a trident. The first example of this personification is on a Roman coin of Antoninus Pius (died 161 A.D.). The figure reappears first on the copper coinage of England in the reign of Charles II. (1665); the celebrated beauty, Miss Stewart, afterwards duchess of Richmond, is said to have served as model to the engraver, Philip Roettier. The Britannia that appears on the reverse of British copper coins since 1825 was the design of Mr. W. Wyon. See NUMISMATICS.

**BRITANNIA METAL.** The present composition of britannia metal varies. Much of it is 90 tin + 8 antimony + 2 copper, without any zinc or bismuth. Another formula is 81 tin, 16 antimony, 1 copper, and 2 zinc. But most of the alloys passing under this

name have between 80 and 90 per cent. of tin with varying proportions of antimony and copper. The manufacture was begun at Sheffield by Hancock and Jessop, in 1770; it reached Birmingham towards the close of the century, and made gradual progress. At first, the articles were made by stamping with dies, and soldering up into form; this being a slow operation, rendered the articles expensive. Afterwards, the curious process of *metal spinning* was introduced; and this, with the subsidiary operation of swagging, rendered a great reduction in price possible. In the spinning process, a thin sheet or piece of britannia metal is placed upon a wooden model shaped like the article to be made; the model is made to rotate in a lathe; and burnishers and other tools are employed to press the yielding metal into all the curvatures of the model. Ductility is an essential quality to the attainment of this end with the metal; how complete it is, may be seen in such articles as britannia metal teapots and dish-covers, the principal forms of which are not given by hammering, stamping, or casting, but by spinning. Besides spinning and swagging, the processes include stamping, soldering, casting, and polishing. When electro-plating was introduced, an increased use of britannia metal arose, as it forms a good ground or basis for the deposited silver. Britannia metal spoons and ladles, made by casting, stamping, and burnishing, have been nearly driven out of the market by German silver; but the former metal is more largely used than ever for hot-water jugs, soup tureens, gravy-dishes, vegetable and side dishes, dram bottles, drinking-cups, sandwich cases, wine-coolers, soap-boxes, liquor-frames, cruets, waiters, trays, etc.; and as a basis for electro-plate. Birmingham and Sheffield are the chief seats of the manufacture. After electro-plating came into general use in the decade 1840-50, the trade in B. M. wares become double what it was previously. A variety of B. M. called *queen's metal* is extensively used for similar purposes, and it ranks intermediate in hardness between pewter and ordinary B. M. Queen's metal is composed of—tin, 9; antimony, 1; bismuth, 1; and lead, 1.

**BRITANNIA SECUNDA**, the Roman name of Wales (q.v.).

**BRITANNIA TUBULAR BRIDGE**, a railway bridge over the Menai strait, remarkable alike for its gigantic dimensions, and as being the first construction of the kind ever undertaken. With a view to facilitate communication with Ireland *via* Holyhead, the directors of the Chester and Holyhead railway in 1845 sought the aid of Mr. Robert Stephenson, the great engineer, to bridge the strait with such a structure as should admit of the safe passage of heavily laden trains without in any way interfering with the navigation of the channel. About a mile above the suspension-bridge, and nearer Carnarvon, a rock in the middle of the strait rose 10 ft. above the water at low tide; and on this site, provided by nature, it was resolved to erect a bridge in the form of a rectangular tube, composed of wrought-iron plates riveted together in a manner to combine the greatest strength with the greatest lightness. See **STRENGTH OF MATERIALS** and **TUBULAR BRIDGES**. In the spring of 1846, the undertaking was commenced; by the 22d of June, 1849, the Britannia tower on the rock in the center of the strait was completed (height, 191 ft. 6 in. above high-water mark). Other two towers, some 18 ft. lower, were erected on each side of the Britannia tower; thus dividing the space into four spans, of which the two center ones are 460 ft. each, the other two being comparatively narrow. The short tubes between the abutments and the short towers were constructed, by means of strong scaffolding and stages, in the places they were to occupy when finished; the long central tubes were built at the water-edge, from whence they were floated off on pontoons to the base of the towers, which had grooves or recesses made to receive them, and then elevated gradually (supports being built under their ends as they ascended) by powerful hydraulic presses to the requisite height, 102 ft. above high-water mark. On the 13th of Oct., 1849, the first long tube, 472 ft. in length (12 ft. being allowed for the rest at both ends), and about 1800 tons in weight, was safely fixed at its proper height above the sea. The other center tube was got up by Dec.; and on the 5th of Mar., 1850, a train swept through, and the bridge was open for traffic. In Aug. the parallel line of tubes was completed, and the up and down trains could now pass over the Menai with as little delay and danger as over any other part of the line. The total length of the bridge is 1841 ft., of the tubes, 1513 feet. The extreme height of the tube at the Britannia tower is 30 ft., diminishing to 22 ft. 9 in. at the abutments, "the difference being made to give a true parabolic curve to the top while the bottom is straight." Inside, the width is 13 ft. 8 in. throughout, and the height 26 ft. at the middle, and 18 ft. 9 in. at the ends. To provide for the expansion and contraction of the metal, the bed-plates in the shore towers and in the abutments, on which the tubes rest, are made to move freely on cast-iron rollers and balls. This precaution, for securing free movement to the tubes, was not unnecessary, as it has been found that between the expansion of summer and contraction of winter there is a difference of fully 12 inches. The total weight of iron used was nearly 12,000 tons, of which the tubes contain 9360 tons of malleable iron, 1015 tons of cast iron, and 175 of permanent railway. In their fabrication 186,000 different pieces of iron, fastened together by more than 2,000,000 rivets, were used; and in the towers, abutments, etc., there is 1,492,151 cubic feet of masonry. The total cost was about £602,000. The whole structure was completed in 1850. See **TUBULAR BRIDGE**. See **ILLU., BRIDGES**.



**BRITANNICÆ INSULÆ**, a term used by ancient classic writers previous to Cæsar for the British isles, including Albion (England and Scotland), and Hibernia or Ierne (Ireland), with the smaller isles around them. Aristotle, in the beginning of the 8d c. B.C., knew only of Albion and Ierne. Cæsar, about 54 B.C., was the first to apply the name Britannia to Albion. Ptolemy, in the 2d c. A.D., is the first to apply Little Britain to Ierne or Ireland, and Great Britain to Albion or England and Scotland. Herodotus, in the 5th c. B.C., is the first writer to mention Britain with any sort of definiteness; previous Greek writers speak of Britain only in connection with the Phenician tin trade carried on with the Cassiterides or Tin isles (the Scilly isles and Cornwall), which they often confound with the Azores. The Phenician trade with the British isles began about 1000 B.C., the Phenicians giving the native Britons salt, skins, and bronze vessels in exchange for tin and lead. Ptolemy enumerates 52 different Celtic or Gaelic tribes as inhabiting Britain in his time. See **CELTIC NATIONS**.

**BRITANNICUS**, son of the emperor Claudius by Messalina, b. 42 A.D. He was the natural successor to Claudius, but after his mother's execution (when B. was eight years old), Agrippina, the new wife, persuaded Claudius to pass by B. and adopt her son by previous marriage with Lucinus Domitius. This son was the emperor Nero; and soon after his accession, Pallas, one of Agrippina's lovers, who had been banished, threatened a revolt, and roused Nero's fear that B. might displace him; so B. was poisoned and died on his fourteenth birthday.

**BRITISH AMERICA.** See **AMERICA, BRITISH**.

**BRITISH ARMY.** In **ARMIES, MODERN**, a succinct account is given of the relative strength and organization of the chief European armies, but a more extended treatment of that of the British empire will be given in the present article.

Like other modern armies, the British army originated in the feudal system (q.v.). When regal power, tempered by a parliament, superseded that system, the people, according to their rank in life, were expected to provide themselves with certain kinds of weapons and defensive armor. The justices of the peace were empowered to see to these military duties of the people. When the nation was either actually engaged in war, or apprehensive of invasion, the sovereign issued commissions to experienced officers, authorizing them to draw out and array the fittest men for service in each county, and to march them to the sea-coast, or to any part of the country known to be in most danger. See **ARRAYER**. It was in the time of Henry VIII. that lord-lieutenants and deputy-lieutenants of counties were first appointed as standing-officers for assembling and mustering the military force. During the earlier years of the Tudors, contracts were made by the king with "captains," who undertook to provide, clothe, and feed so many fighting-men, for a given money-allowance; but the power intrusted to the lord-lieutenants gradually changed this system, in relation at least to home-defense. In the reign of Charles I., the important question arose, whether the king of England did or did not possess the right to maintain a military force without the express consent of parliament? and this question was all the more bitterly discussed when the king billeted his soldiers on the people. After the troubles of the civil wars and the commonwealth, Charles II. found himself compelled to agree, on his restoration, to the abandonment of all the army except a kind of body-guard or household brigade of 5000 men, sanctioned by the parliament. In the 18th year of his reign, he succeeded in obtaining a statute, declaratory that "the sole and supreme power, government, command, and disposition of the militia, and of all forces by sea and land, and of all forts and places of strength, is the undoubted right of his majesty; and both or either of the houses of parliament cannot nor ought to pretend to the same." Both Charles II. and James II. found, however, to their mortification, that this statute did not in effect give them so much real military command as they had wished and intended—because the commons, by holding the purse, virtually held the power.

The real basis for the modern B. A. was laid in the time of William and Mary; the declaration of rights (see **BILL OF RIGHTS**; **RIGHTS, DECLARATION OF**) providing "that the raising and keeping of a standing army in time of peace, without consent of parliament, is contrary to law." The first mutiny act (q.v.) was passed in 1689, to last for six months only; but it has been annually renewed ever since, except in three particular years; and it constitutes the warrant on which the whole military system of England is exercised by the sovereign, with the consent of parliament. Since then, with only three interruptions, the ministers of the crown have annually applied to parliament for permission to raise a military force, and for money to defray the expenses. The sovereign can make war, and can bestow military employments and honors; but the commons, as the representatives of the tax-paying nation, provide a check on the grasping by courtiers of military privileges. The law on army regulation has been revised, and the B. A. made the subject of special legislation in the army discipline bill passed in 1879.

The great distinction between the B. A. and that of almost every other state in Europe, is that the service is *voluntary*. The subjects of the crown engage, by free choice, to serve in the army for a definite number of years. In the rare cases where forced service by ballot is obtained, it is in the militia, not the regular army. See **MILITIA**. The British soldier has much hard colonial life to bear, and many long voyages to make; he is, moreover, almost entirely shut out from the chance of being a commis-

sioned officer. As a consequence, the ranks are mostly filled from the more necessitous classes of the community—by those who from want of steady habits, or of education, are the least fitted for industrious pursuits; whereas in France and many other foreign countries, the profession of arms is regarded as an honorable one, of which even the private soldier feels proud. Mr. De Fonblanque, comparing the peace establishments of the chief European armies in 1857, found that of England to be the smallest in ratio to population, but the most costly in relation to its strength. The English ratio was 1 in 138; the French, 1 in 95; the Prussian, 1 in 80; the Russian, 1 in 72; the Austrian, 1 in 68. An English private soldier costs the country £52 per annum; French, £36; Prussian, £31; Austrian, £18 10s.; Russian, £13 5s. The English cost per man is still higher now than it was in 1857, on account of increased attention being paid to the well-being of the soldier.

The B. A., in all its completeness, is supposed to be commanded by the sovereign, assisted by the secretary of state for war in some matters, and by the officer commanding in chief in others. The component elements are the household troops; the infantry of the line; the cavalry of the line; the ordnance corps, comprising artillery and engineers; other bodies of native troops, maintained out of the revenues of India; the militia; the yeomanry cavalry; the reserve; the volunteer artillery and rifles; and sometimes during war, foreign legions. The "peace establishment" of the B. A. varies according to the political aspect of affairs abroad, and to the strength of the economizing principle at home. In 1814, when England was engaged in tremendous contests abroad, the regular army reached 200,000 men, exclusive of fencibles, foreign legions, and militia. In the first few years after the termination of the great war against Napoleon, the reductions in the B. A. involved the compulsory retirement of no less than 10,000 military officers, who thereupon went on half-pay; these, by filling vacancies, transfers, and deaths, have nearly disappeared. The elasticity which permits the enlargement or contraction of the army arises from varying, not so much the number of regiments, as the number of battalions in a regiment, of companies in a battalion, or of men in a company. If we compare the strength of the regular army at various periods between 1820 and 1890, we shall find that the actual number of regiments has varied but little, the difference of strength being made up in the three modes just mentioned.

The strength of the B. A. declined from 1815 to 1835, since which last-mentioned year it has increased. These augmentations have been occasioned partly by the contests in China, India, Kaffraria, Persia, the Crimea, Afghanistan, and Zululand, and partly by a sense of insecurity amid the vast armaments of the continent. In comparing the strength of the forces at different periods, much confusion is apt to arise from different modes of interpreting the words "British army." This designation may include the whole of the royal troops in India, whether supported out of imperial or of Indian revenues; it may include the militia, the volunteers, the yeomanry cavalry, the foreign legions—or it may exclude any one or more of these. The "British army," and the "military force of the British empire," are often treated as convertible terms: to the production of much confusion where actual numbers are given. In the following table, relating to the official year 1896-7, it is shown of what component elements the B. A. now consists. The militia and the volunteer corps are not here included.

## ARMY ESTIMATES FOR 1896-7.

	United Kingdom.			Indian.	
	Officers.	Non-com. Officers, Drummers, etc.	Rank and File.	European Army.	Native Army.
Cavalry.....	553	1,368	11,396	5,679	23,285
Artillery.....	870	1,959	20,457	13,306	4,523
Engineers.....	594	1,264	5,641	369	.....
Infantry.....	2,804	6,655	79,587	53,746	113,541
Colonial corps.....	164	394	4,883	.....	.....
Departmental corps.....	199	1,399	3,062	.....	.....
Army Service corps.....	246	818	2,792	.....	.....
General and Departmental staff.....	1,316	136	6	820	.....
Miscellaneous Establishments.....	188	494	129	.....	.....
General List Cavalry.....	.....	.....	.....	17	.....
General List Infantry.....	.....	.....	.....	50	.....
General Officers Unemployed.....	.....	.....	.....	37	.....
Sappers and Miners.....	.....	.....	.....	.....	4,206
Invalid and Veteran Establishments.....	.....	.....	.....	23	.....
<b>Totals.....</b>	<b>6,934</b>	<b>14,487</b>	<b>127,953</b>	<b>74,036</b>	<b>145,565</b>
Total United Kingdom.....				149,374	
Total European Indian.....				74,036	
Total Native Indian.....				145,565	
Total British Army.....				368,975	

The House of Commons, by an annual vote, determines the number of troops and the cost of maintaining the different branches of the service. At the beginning of every session Parliament passes an act known as the Army Bill, investing the Crown with extensive powers for regulating the army and with the right to frame the Articles of War which form the military code. The administrative control over all the army services is in the hands of the secretary of state for war, aided by under-secretaries of state and by the heads of the principal departments. These principal departments are those of the commander-in-chief, adjutant-general, quartermaster-general, inspector-general of fortifications, inspector-general of ordnance, whose heads constitute a board presided over by the commander-in-chief. This board reports on the proposed estimates for the army, which the secretary of state lays before Parliament, and on promotions, appointments and other matters affecting the administration of the army. Its members under the presidency of the secretary of state, and with such additional military officers as they choose to summon, constitute the war office or council. A large part of the regular force is maintained in the United Kingdom. On January 1, 1896, the number of officers and privates maintained for service there was 107,636.

In addition to the regular troops there are four classes of reserves, i. e., the Militia, the Yeomanry Cavalry, the Volunteer corps, and the Army Reserve force, which when added to the regular forces, home and colonial and on Indian establishments, made the total effective force of 715,688 in 1895-6. The two leading institutions for the instruction of officers are the Royal Military College at Woolwich and the Royal Military and Staff College at Sandhurst. The total amount for maintaining the military services in 1895-6 was £18,053,800.

**BRITISH ASSOCIATION**, an association whose object is, by bringing together men eminent in all the several departments of science, to assist the progress of discovery, and to extend over the whole country the latest results of scientific research. A prevailing impression that England had fallen behind other countries, both as to the general estimation in which scientific men were held, and the prosecution of science itself, led to its formation. It was thought that an imposing union of men of science with the nobility, gentry, and clergy might tend to revive the philosophic spirit of the country. Such meetings had already taken place in Germany, and probably suggested the idea of this institution. Many leading men of the age took part in its formation, but the honor of being its founder must be ascribed to sir David Brewster. By his exertions the first meeting of those who were favorable to the design was held at York in the year 1831. The archbishop of York, the mayor and council of the city, entered warmly into the project. At this meeting the constitution of the society was determined, the several sections had their provinces assigned to them, and subjects were proposed on which reports were to be drawn up and read at the ensuing meeting. This took place at Oxford in 1832. The university had cordially welcomed the new association, the papers which were read gave it at once the high character it has since sustained, and from this date it may be said to have been in complete and successful operation. An enumeration of the several sections of the society, each of which has its own committee and president, will show the wide range of topics it embraces: Section A., mathematical and physical science; B., chemistry; C., geology; D., zoology, botany, anatomy, and physiology; E., geography and ethnology; F., economic science and statistics; G., mechanical science; H., anthropology.

At the close of each meeting, it is determined at what town in the United Kingdom the next shall be held, and a president of the whole association is appointed, who delivers an inaugural address, in which he is expected to present a general survey of the latest advances of science. The rules and by-laws of the society it is not necessary here to particularize; but it should be mentioned that the subscriptions of a continually increasing membership have placed at its disposal a large fund, which has been expended in the prosecution of science. In many cases, as in long astronomical calculations, or extensive meteorological observations, the labor of subordinates is required, and a certain apparatus, and it is in defraying such expenses that the funds of the B. A. are very wisely employed. The A. met at Montreal, Canada, 1884.

Besides the immediate ends sought to be obtained by such an association, its utility will be evident if we reflect on the intimate connection that exists between the several branches of science, and the impossibility there is that any one mind can be thoroughly conversant with them all. He who now hopes to make discoveries in science must limit himself to a few chosen studies; and yet such is the interlacing of all the several branches of inquiry, that he must often find it indispensable to know the last results of each. The botanist or the physiologist must consult the accomplished chemist; the chemist must call in the aid of those who have specifically studied the action of heat, light, and electricity; the geologist needs them all, and is in turn consulted by all. Thus, a certain brotherhood of science is formed, in which each has his specialty, and yet each leans upon his brother.

In ancient times it was otherwise. The facts on which a philosopher speculated were those which lay open to the eyes of all. A Thales could see the rain fall and plants grow, and forthwith pronounced that the vital energy of all things was to be found in

water. He could exercise his imagination in perfect independence of the labor of all other men. The philosopher of modern times cannot move a step without a careful consideration of the theories of his predecessors and contemporaries; he has to take notice of the innumerable facts brought to light by various observers, aided by those artificial arrangements which convert observation into experiment.

Two classes of men, of the most opposite character, are greatly aided by an association such as this. The humble and plodding workmen are taught where their patient industry will most avail; they are cautioned against re-discoveries; they are told where their love of collecting or experimentalizing may be best applied. And that other class of men, who love to generalize, who ever seek to embrace all the multifarious facts of science under a few great laws—these are provided with the very last intelligence from every department of inquiry, and may forthwith proceed to weave it into their own comprehensive scheme. Nor are we to overlook the benefit which the whole community derives from the rapid dissemination of the latest results or speculations of philosophy. Not only do the idle and fashionable, as well as the manufacturing towns and the universities, welcome the meetings of the B. A., but from this *Parliament of Science* the utterance of scientific opinion goes forth over the whole kingdom through the agency of the press. There is an American association, meeting in the various towns of the United States, and since 1872 there has been a French *Association pour l'Avancement des Sciences*.

**BRITISH ASSOCIATION UNITS.** See ELECTRICITY.

**BRITISH BURMAH.** See BURMAH.

**BRITISH COLUMBIA.** See COLUMBIA, BRITISH.

**BRITISH EMPIRE.** See GREAT BRITAIN and IRELAND.

**BRITISH GUM, DEXTRINE, or LEP'OCOME,** is a substance extensively employed by calico-printers and others for the thickening of colors, instead of the much more expensive gum arabic. It is prepared from potato-starch (q.v.) or sago-starch by passing the grains through iron cylinders at a temperature about 500° F. It differs from starch in giving no blue color with tincture of iodine, and in being readily soluble in water, and thus yielding a thick liquid resembling in consistence mucilage (strong solution of ordinary gum). B. G. is the material which is produced by baking in the crusts of loaf-bread (q.v.), and which communicates to them their very agreeable taste.

**BRITISH MUSEUM.** The British Museum, an important national institution in London, originated in a bequest of Sir Hans Sloane, who, during a long lifetime, gathered an extensive and, at the time, unequaled collection of objects of natural history and works of art, besides a considerable library of books and manuscripts. These, in terms of his will, were offered, in 1753, to the government, on condition that £30,000 should be paid to his family, the first cost of the whole having amounted to more than £50,000. The offer was accepted; the necessary funds were raised by a lottery; and the collection, along with the Harleian and Cottonian libraries, were arranged in Montague House, which had been purchased for £10,250. The new institution, thenceforth called the British Museum, was opened in 1759. From time to time, purchases and donations succeeded each other rapidly. Montague House sufficed for the reception of all these acquisitions, till the Egyptian antiquities arrived in 1801. The purchase of the Townley marbles, in 1805, necessitated the erection of a gallery for their reception. This, however, did not meet the increasing demand for space. The old house was condemned, and plans were prepared by sir R. Smirke for new buildings; but none were undertaken till 1823, when the eastern wing of the present building was erected for the reception of the library of George III., which had been presented to the museum by George IV. The subsequent progress of the works was very slow. The building was completed in 1847. It is a hollow square, whose sides are opposite to the four points of the compass. Throughout the exterior of the building, the Grecian Ionic is the order of architecture adopted. The principal front is towards the s., facing Great Russell street, and presents an imposing columnar façade, 370 ft. in length. The great entrance-portico, in the center, is composed of a double range of columns, 8 in each range. The columns are 5 ft. in diameter at their base, and 45 ft. in height. The tympanum of the portico is ornamented with an allegorical sculpture by Westmacott, typical of the progress of civilization. On either side of the museum, there is a semi-detached house, containing the residences of the chief officers of the establishment. These give an additional length of 200 ft., making the whole length of the structure 570 feet. The interior of the building is admirably adapted to the purposes for which it is devoted. Some of the galleries, from their size and dimensions, have a very imposing appearance, as the king's library, the bird gallery, etc. The grand entrance-hall is a noble and lofty apartment, built in the massive Doric style: it contains a statue of sir Joseph Banks by Chantrey, and an ideal representation of Shakespeare by Roubilliac.

Scarcely had Smirke's plans been carried out, when demands were made from several of the departments for more accommodation. Additions have accordingly been made, rooms having been provided for the print department, and several new galleries for the recent acquisitions of antiquities; but the most important addition is the mag

nificent reading-room which has been erected in the internal quadrangle. In no department of the museum was additional accommodation more needed than in the library. The number of readers had increased beyond the means of accommodation, and so short of space were they for books, that the estimates for purchases were restricted to only the half of the sum which the trustees considered desirable, for the sole reason that the library would be inadequate for the reception of extensive additions. After considerable delay, and the consideration and rejection of several plans, nothing was done till Mr. Panizzi, at that time keeper of the printed book department, suggested a plan which promised to meet the important requirements of speedy erection and economy in cost. The plan was at length adopted, and the result is a building than which none are better, few perhaps so thoroughly adapted to the purposes for which it is intended. Parliament voted the first grant for it in 1854. It was opened in 1857. The total cost was about £150,000, which includes the fittings and furniture, and the necessary shelves for immediate use. The building was erected in the interior quadrangle, which it completely occupies, with the exception of an interval of about 28 ft. all round, necessary for lighting and ventilating the surrounding building. The reading-room is circular. It is constructed principally of iron, with brick arches between the main ribs. The dome is 106 ft. in height, and its diameter 140 ft., being second only to the pantheon of Rome, and that but by 2 feet. The use of iron has economized the space to an extraordinary degree, for while the piers which support the pantheon fill 7477 ft., those on which the reading-room rests occupy only 200 feet. Equally remarkable has been the saving of space in the fitting up of the library. The shelves are formed of galvanized iron plates, edged with wainscot, and covered with leather, and are supported on malleable iron standards. In all the cases except against the external walls, the bookcases are double, a lattice of ironwork being fixed for the longitudinal separation of the books. Thus, throughout the whole interior of the new building, walls are dispensed with, the divisions being in all cases formed of the double ranges of books. The building contains 8 m. lineal of bookcases 8 ft. high. Assuming them all to be spaced for the average octavo book size, the entire ranges form 25 m. of book-shelves, and would accommodate 1,000,000 such volumes. In addition to this, the dome-room, which is the reading-room, has accommodation for 60,000 volumes. This magnificent room contains ample and comfortable accommodation for 300 readers. Each person has a space of 4 ft. 8 in. long. He is screened from the opposite occupant by a longitudinal division, which is fitted with a hinged desk, graduated on sloping racks, and a folding-shelf for spare books. In a recess between the two are placed an inkstand and penholders, thus leaving the table unincumbered. By an ingenious contrivance, one part of the iron framework is made to distribute fresh air in the summer and heated air in the winter. The vitiated air is conveyed through apertures in the soffits of the window, into one of two separate spherical and concentric chambers which extend over the whole surface of the roof, and escapes through outlets around the lantern. The other chamber, between the external covering of copper and the brick vaulting, has for its object the equalization of temperature, during extremes of heat and cold out of doors. Every modern improvement, in short, has been applied, when it could be serviceable, for the comfort or convenience of the readers. Much praise is due to the architect and builder, but a larger share is owing to the late sir A. Panizzi, who not only supplied the original design, but daily, almost hourly, superintended the progress of the work, continually suggesting little improvements, and in the end producing a room which is admired by all especially those who daily use it.

This building, while supplying amply the demands of the printed book department, did nothing, to meet the requirements of the other departments. Various schemes were suggested; the best, and perhaps in the end, the cheapest, plan of securing the ground immediately around the museum, was given up, and the trustees then resolved to erect a building to be devoted entirely to natural history—that is to say, to the departments of botany, zoology, geology, and mineralogy—on the site occupied by the international exhibition of 1862. Parliament voted in the year 1873, £80,000 for this purpose, and a beginning was made by the contractor. The whole cost of the new building very nearly reached the sum of £400,000. This elegant new terra-cotta building, situated in the Cromwell road, near South Kensington Museum, was designed by Mr. Alfred Waterhouse. The building at Bloomsbury has recently been enlarged.

*Contents.*—At first, the contents of the museum were arranged under three departments—printed books, manuscripts, and objects of natural history. Under the last head were included the antiquities, works of art, etc., comprised in the Sloane Collection, their number being too scanty to entitle them to constitute a separate department. The progress of the museum has caused a more precise division of its contents. From time to time, the number of the departments has been increased, so that, instead of three, there are now eleven: printed books (with maps), manuscripts, prints and drawings, oriental antiquities, Greek and Roman antiquities, coins and medals, British and mediæval antiquities and ethnography, zoology, botany, geology, and mineralogy. In noticing the contents of the museum, we shall refer to them in this order. We can but allude here to the most important portions of the collection, and must refer for more particular information to works specially devoted to this subject; such as the various handbooks and catalogues prepared by the officers of the museum.

*Printed Books.*—This is the largest department in the museum. It occupies the whole of the ground floor on the n. and e. sides, the new building erected in the quadrangle, and a considerable portion of the basement of the museum. The keeper of the department has the help of 3 assistant-keepers and 43 assistants. There are in addition 54 attendants.

The original bequest of sir Hans Sloane consisted of 50,000 volumes. When these were placed in Montague House, a small collection of 2000 volumes, bequeathed to the nation by Maj. Edwards in 1788, was added to them. In 1757, George II. presented the library of printed books which had been collected by the kings of England since Henry VII., and which included the libraries of Cranmer and Casaubon. He also annexed the important privilege, which the royal library acquired in the reign of queen Anne, of being supplied with a copy of every publication entered at Stationers' Hall. By this means the library has been supplied with the current British literature without expense or trouble, and the trustees have been able to devote the funds of the museum to the purchase of the earlier literature of the country and foreign publications. Among subsequent additions to the library may be mentioned the voluminous collection of pamphlets, etc., relating to the civil wars of England between 1640 and 1660, presented by George III.; the musical libraries of sir J. Hawkins and Dr. C. Burney; Garrick's collection of old English plays; Dr. Bentley's collection of the classics, annotated by his own hand; the law library of F. Hargrave; sir J. Banks's valuable and extensive collection on natural history; and a large mass of tracts and pamphlets relating to the French revolution, purchased from J. Wilson Croker, and of very great value. The most important addition was made in 1823, when George IV. presented the splendid library that had been collected by his father during his long reign, at an expense of little less than £200,000. This library, which, from the terms of the gift, cannot be mixed with the general collection, occupies a large and handsome hall, extending along the whole of the ground floor of the eastern side of the museum. It is undoubtedly the finest and most complete library ever formed by a single individual. "It contains," says sir H. Ellis, "selections of the rarest kind, more especially works of the first ages of printing; it is rich in the early editions of the classics; in books from the press of Caxton; in the history of the states of Europe; in the languages of the respective countries; in the transactions of academies; and in a grand geographical collection." The magnificent library of the right hon. Thomas Grenville, in importance second only to the king's library, was bequeathed to the museum in 1846. It consists of 20,240 volumes, which cost upwards of £54,000. In the same year was obtained also the extensive collection of Chinese works, amounting to 11,509 volumes, which belonged to Robert Morrison. By purchases, bequests, and donations, the library has become one of the first in the world, containing now over 1,500,000 printed volumes. See LIBRARIES. But even this figure, large though it is, does not represent the immense collection of separate and distinct articles in tracts, pamphlets, and manuscripts. The British Museum library is (with the exception, perhaps, of the national library of Paris) the largest collection of printed literature in the world. Since the opening of the new reading-room, and the consequent acquisition of the book accommodation, the want of which long hindered the proper increase of the library, the rate of increase has been enormous. During the year 1880, there were added 27,543 volumes, including music and volumes of newspapers, of which 2879 were presented, 15,361 purchased, 8857 acquired by home copyright, and 941 by international copyright. The number of parts of volumes was 89,878. In addition, the library had accumulated numerous broadsides, and miscellaneous articles variously obtained. The numbers of the pieces of music alone added were 5911 complete works, besides 1790 parts and numbers of works in progress. The total number of articles received during the year amounted to 76,774. In 1886, 83,844 volumes were added.

A catalogue of the printed books, in 7 octavo volumes, was published in 1813-19. So great have been the additions to the collection since the publication of that catalogue, that in 1880 the general MS. catalogue occupied upwards of 2000 folio volumes. At the end of 1887, 169 printed volumes had taken the place of 633 in manuscript, and it is calculated that the beginning of the 20th century will see the whole of the catalogue represented by some 8000 printed volumes. The adoption of printing has also facilitated the commencement of a subject-catalogue of all new acquisitions, and the first instalment of this was issued in 1886. Another important catalogue issued by this department is that of English books published previously to 1641, a work of the highest bibliographical importance. Here also are copies of the catalogue of the books of reference, arranged around the wall of the room, to which the readers have free access without the intervention of an official. These books, forming a library of 20,000 volumes, have been carefully selected to represent all the different branches of knowledge. The facility of consultation has been increased by the employment of different colors in the binding, corresponding to the colors of a hand catalogue scattered throughout the room. Thus theological works are bound in blue, historical in red, philosophical in green, and so on.

The right of access to the library is easily obtained. Any person desiring it, is "to apply in writing, addressed 'To the principal librarian of the British Museum,' and not otherwise, specifying his description and place of abode, and accompanying his letter with a written recommendation, satisfactory to an officer of the museum." Formerly,

the right of admission was granted only for six months at a time, and had then to be renewed. Under the new regulations, the ticket, once granted, does not require renewal; it can, of course, be withdrawn, and is not granted to persons under 21 years of age. When the reader has become well known to the officials, he is not even asked to show his ticket. The number of readers in 1886 was 176,893.

**Maps.**—The maps, charts, plans, and topographical drawings were separated from the library, to form a distinct department, in 1867. There are over 50,000 published and 20,000 manuscript maps in the museum. Many of the latter have thrown much light on the history of early geographical discovery.

**Manuscripts.**—The manuscripts are contained in several rooms in the s.e. angle of the building. The work of the department is carried on by a keeper, assistant-keeper, a keeper of oriental manuscripts, and nine assistants. The manuscripts are for the most part bound in volumes, and placed in cases around the rooms. The collection consists of: 1. The Sloanean manuscripts, relating chiefly to medical and natural history subjects. 2. The Cottonian manuscripts, rich in documents referring to the history of Britain, including two of the originals of *Magna Charta*, in registers of English monasteries, and in original letters of royal and illustrious personages. This collection contains the *Durham Book*—a copy of the Latin Gospels, with an interlineary Saxon gloss, finished in the year 720. 3. The Harleian manuscripts, a collection rich in illuminated manuscripts, in ancient, civil, and ecclesiastical records, in manuscripts of the classics, among which is one of the earliest known copies of the *Odyssey*, and in early English poetry. 4. The manuscripts of the ancient royal library. These were collected by our kings, from Richard II. to George II.; many of them were obtained from the monasteries, on their destruction. Amongst the most valuable treasures here are the *Codex Alexandrinus*, a manuscript of the Bible written in uncial Greek, before the close of the 5th c.; and the *Basilicon Doron* of James I., in his own handwriting. 5. The Lansdowne manuscripts. This collection comprises the Burghley and Cæsar papers, the manuscripts of Bishop Kennett, and numerous valuable historical documents and state papers. 6. The Hargrave manuscripts, almost exclusively connected with law. 7. The Burney manuscripts, containing a large collection of the Greek and Latin classics. Among them is a copy of the *Iliad*, answering that of the *Odyssey* in the Harleian collection. 8. The Howard-Arundel manuscripts, obtained from the royal society. This collection is singularly rich in materials for the history of our own country and language. 9. The Oriental manuscripts, a collection composed of several purchases and bequests. It includes the manuscripts acquired by Mr. Rich while consul at Bagdad, and consists of numerous Syriac, Arabic, Ethiopic, and other oriental codices. A large series of Ethiopic manuscripts was obtained at Magdala, on the occasion of the Abyssinian war. 10. Additional manuscripts. This collection consists of innumerable bequests, donations, and purchases, which from the establishment of the museum have been and are still being acquired. Among recent additions may be specified a charter of William the Conqueror; the original mortgage-deed of a house in Blackfriars, dated 11th Mar., 1612, and signed by William Shakespeare; the holograph manuscript of Scott's *Kenilworth*, and of many of Burns's poems, including the *Cotter's Saturday Night*, and the songs published in Johnson's *Scots Musical Museum*; an extensive series of papal bulls; several *Books of Hours*, including the famous *Bedford Missal*; and a large collection of original letters and papers relating to the affairs of Scotland during the 16th and 17th centuries. Catalogues of the complete collections have at different times been published. The additions to the ever-increasing oriental and additional collections are at intervals published in supplements to each of the original catalogues. Copies of all these, with manuscript lists of the annual additions, are placed in the reading-room for consultation.

Supplementary catalogues were printed up till 1853; since then the additions have been kept up in manuscript catalogues. A general class catalogue, embracing all the collections, has been commenced, and the printing of it has begun. The first part is a catalogue of ancient and illuminated manuscripts, illustrated with photographic *fao-similes*, of which several volumes are published.

The right of using the reading-room includes the privilege of consulting the manuscripts. During 1880, the number of deliveries of manuscripts to readers in the reading-room amounted to 29,239. To artists and others in the rooms of the department, 6000 deliveries were made. These numbers do not include the volumes exhibited to visitors on private days.

**Prints and Drawings.**—The collections of this department, managed by a keeper and two assistants, are kept in rooms in the n.w. angle of the building. They consist of prints and drawings bequeathed to the museum, in 1799, by the Rev. C. M. Cracherode; of those bequeathed in 1824 by Mr. Payne Knight; and of numerous smaller bequests and donations. No purchases were made for this department until about 1840, when a sum was first included in the estimates for this purpose. Since that time, the prints and drawings have been increasing at a rate equal to any of the other departments of the museum. The collection is arranged in *schools*. 1. The Italian school, containing original drawings by Leonardo da Vinci, Raphael, Correggio, Tintoretto, Paul Veronese, Michael Angelo, Guido Reni, Salvator Rosa, and others. 2. The German school, containing drawings by Albert Dürer, Hans Holbein, Dietrich, Hollar, and others; and

engravings by Lucas Cranach, Martin Schon, Gauer, and others. 8. The Dutch school, containing several superb originals of Rubens, an extensive and nearly complete set of the works of Rembrandt, with many drawings by A. Cuyp, Teniers, Van Dyck, etc.; and engravings and etchings by Berghem, Lucas van Leyden, Rembrandt, Ostade, etc. 4. The French school, with drawings by Watteau, Claude Lorraine, etc., and etchings and engravings by Bourdon, Boisseaux, Le Prince, etc. 5. The Spanish school, represented by some drawings of Murillo, and others of less note. 6. The English school, containing drawings by R. Wilson, Wilkie, Stothard, Callcott, Gibson, etc.; a splendid collection of Hogarth's prints, and specimens of the works of Barlow, Gaywood, Raimbach, Finden, Worlidge, Geikie, etc. 7. Specimens of Japanese art.

This department contains also an extensive and very valuable collection of works in niello; a beautiful silver cup, designed and carved by Benvenuto Cellini, and a wonderful stone-carving in alto-relievo by Albert Dürer, representing the birth of St. John.

*Oriental Antiquities.*—Within the last ten years the objects in the museum, included under the name antiquities, have been divided into four departments. The first of them includes the Egyptian and Assyrian antiquities. The Egyptian monuments date from a period as remote as 3000 years before the Christian era, and come down to the Mohammedan invasion of Egypt, 640 A.D. The collection has been obtained chiefly from these sources: the antiquities which fell into the hands of the British army at the capitulation of Alexandria, presented by George III.; presents from Gen. Vyse, the duke of Northumberland, the marquis of Northampton, sir Gardner Wilkinson, and others; and acquisitions from the earl of Belmore, Mr. Salt, and M. Anastasie. The sculptures are formed of granite and basalt; they represent human and allegorical figures, sometimes of colossal size. There are several beautifully sculptured sarcophagi. Most of the monuments are inscribed with hieroglyphics (q.v.). The key to this dead and forgotten language was furnished by the celebrated Rosetta Stone (q.v.), which is placed in the center of the gallery. The smaller Egyptian remains are exhibited in a gallery on the upper floor; they consist of objects relating to religion, as representations of divinities and sacred animals, in wood, metal, stone, and porcelain; of objects relating to civil and domestic life, as dress, personal ornaments, household furniture, artistic and writing implements, armor, and weapons of war, etc.; and of objects relating to death and burial, as mummies and coffins, with the scarabæi, amulets, and other ornaments found with them. A collection of papyri is exhibited on the n.w. staircase, containing extracts from the ritual of the dead.

The Assyrian antiquities are contained in a suite of rooms recently erected on the outside of the Egyptian gallery, and in a spacious room on the basement. The collection consists of sculptures excavated at Nimrud, Khorsabad, and Koyunjik by Layard, in 1847-50, and more recently by Rassam and Loftus, under the direction of sir H. C. Rawlinson. The Nimrud sculptures are the oldest, belonging to a period ranging from 930 B.C. to 747 B.C. Those obtained from Khorsabad seem to have been executed under a monarch who reigned about 747-721 B.C., while the collection from Koyunjik belong to the time of Sardanapalus, apparently 721 B.C. and 625 B.C. The monuments consist chiefly of slabs of gypsum, alabaster, and limestone sculptured in low relief, the subjects being the exploits of the king whose palace walls they ornamented. Many of the sculptures are covered with cuneiform (q.v.) writing, which, by the labors of Rawlinson, Hincks, and Smith, has been deciphered, giving us a history of this remarkable people, and corroborating the narrative of the sacred Scriptures whenever they refer to the same event. See ASSYRIA. Besides the series of sculptures, the Assyrian collection includes a variety of smaller but highly curious and instructive objects, discovered at Nimrud and Koyunjik.

*Greek and Roman Antiquities.*—This collection occupies four apartments, which run parallel to the Egyptian gallery. The Lycian gallery contains a series of architectural and sculptural remains from ancient cities in Lycia, obtained by sir C. Fellows in 1842-46. In a new gallery are the remains of the famous mausoleum (q.v.) at Halicarnassus, erected in honor of Mausolus by his widow Artemisia. These remains were discovered by C. T. Newton, esq., in 1857-59. In another room are some remains of the temple of Athene Polias at Priene, including the stone on which its dedication by Alexander the great is inscribed. The Elgin gallery contains the sculptures from Athens and Attica, the greater portion of which were obtained by the earl of Elgin, and purchased from him by parliament in 1816 for £35,000. The most important series in the gallery is the decorations of the parthenon (q.v.), which, notwithstanding their dilapidated condition, form the most valuable monument of Greek art which has descended to modern times. The gallery contains also sculptures and casts from the temple of Wingless Victory, the temple of Theseus, and the erechtheum, at Athens. In an extension recently made to this gallery, are a colossal lion from Cnidus, and a drum of a sculptured column, and other remains, from the temple of Diana at Ephesus. The Hellenic gallery contains a number of antiquities brought from Greece and its colonies at different times. The most important are 23 slabs of a frieze sculptured in mezzo-relievo, which, from the locality where they were found, are called the "Phigalian marbles."

The gallery on the s. side of the building is occupied with the Roman and Græco-Roman sculptures. The bulk of the collection was formed by Charles Townley, esq., and purchased in 1805 for £30,000. Subsequent additions have been made by the bequest



of the collection of R. P. Knight, esq., in 1824, and by various purchases and donations. The collection contains an interesting series of Roman portrait sculptures, and a very extensive mythological series, amongst which are some of universal fame—the Venus, Clytie, the Discobolus, and many others. A room on the basement is appropriated to mosaics and miscellaneous monuments, such as representations of animals, architectural and decorative fragments, and sacred and domestic implements. A fine collection from southern Italy, exhibiting specimens of the arts of the Etruscans, Greeks, and Romans, was bequeathed to the museum by sir William Temple in 1856. The former reading-room of the department of prints is now occupied by a collection of Greek and Roman sepulchral monuments.

The collections of smaller remains are placed in a suite of rooms on the upper floor. They consist of—1. An extensive series of vases, commonly though not correctly known as Etruscan, formed from the collections of sir W. Hamilton and Mr. Burgon, from purchases at the sales of the prince of Canino, M. Durand, and others; and from excavations in Sicily, Rhodes, and on the sites of Greek colonies in Cyrene and elsewhere. 2. A miscellaneous collection of terra-cottas, mural paintings, and other objects. 3. Bronzes of Greek, Etruscan, and Roman workmanship, consisting of sculptures, and various domestic and other articles, as candelabra, lamps, vases, horse-trappings, armor, etc. 4. The collection of engraved gems and gold ornaments now, since the addition of the Blacas and Castellani collections, perhaps the richest in the world.

*Coins and Medals.*—The very large collection of these objects is arranged in chronological order under five great divisions, viz., Greek, Roman, Mediæval and Modern, English, and Oriental. The department is under the care of a keeper, assistant-keeper, and four assistants.

*British and Mediæval Antiquities and Ethnography.*—The British collection is arranged in chronological order. The oldest series contains the antiquities of the stone and bronze periods, consisting of celts, daggers, swords, shields, and early pottery. The British-Roman antiquities comprise specimens of earthenware, lamps, and miscellaneous articles. A small collection of sepulchral urns, weapons, and personal ornaments represents the Anglo-Saxon period. The antiquities found in London, and belonging to the late C. R. Smith, have been recently added to this collection. The ethnographical collection contains antiquities, as well as objects of modern use, belonging to all nations not of European race.

In 1855, the extensive collections of antiquities and ethnography, belonging to Henry Christy, became the property of the museum, having been bequeathed by their proprietor, and these are now exhibited in the former Bird Gallery. Felix Slade bequeathed his valuable collection of glass to the museum, and it is now arrayed so as to show the different phases through which the art of glass-blowing has passed, as well as the history of glass in all its branches.

*Natural History.*—In 1856 the trustees united the natural history departments under prof. Owen, who was then appointed superintendent of natural history. The building erected at Kensington in 1881 is intended to accommodate this section of the present museum.

*Zoological Department.*—To give an idea of the contents of this and the other natural history departments, would be to write an epitome of the various sciences they illustrate. This department contains a collection of animals arranged in systematic order in the galleries, comprising stuffed mammals, birds, reptiles, and fishes, and the hard portions of radiate, molluscan, and articulate animals. A room is specially devoted to the fauna of Britain. In rooms on the ground and basement floors are arranged the collections of insects, of osteology, and of specimens preserved in spirits. An idea of the extent of the collection may be formed from the fact that 142 separate publications, illustrative of the contents of the department, in the shape of catalogues, lists, etc., have been issued under the superintendence of the present indefatigable keeper, Dr. Gray. Later additions are the magnificent Gould Collection of humming-birds and the Walsingham Collection of birds and birds' nests. In 1873, the unique and extensive collection of birds formed in the eastern archipelago by Wallace, was acquired by purchase. In 1880, 24,283 specimens of animals were added.

*Botanical Department.*—The herbarium of sir H. Sloane, the nucleus of this collection, consisted of about 8000 species, bound in 262 volumes. In 1820, the magnificent herbarium of sir Joseph Banks was bequeathed to the museum, and under the superintendence of the late Robert Brown, was transferred to two rooms prepared for it in the s.e. angle of the building. The collection has since been rapidly increasing: during the year 1880, some 9000 species of plants were added. In the year 1873, the late William Wilson's herbarium of British and foreign mosses was acquired by purchase. The collection contains an extraordinary number of typical specimens—the identical plants from which the original descriptions were taken by Linnæus, Aublet, Jacquin, Brown, Bentham, Bennett, and others. The exhibition rooms contain a series of specimens illustrating the most striking characteristics of the great divisions of the vegetable kingdom, arranged in order; and a series of fossil plants, the value of which is increased by the transparent sections showing their structure, which are placed beside them.

*Geological Department.*—This collection occupies the wall-cases of the principal gallery on the n. side of the museum. It contains an extensive series of the fossil remains of plants and animals from the various fossiliferous strata; it is especially rich in the

fossils of the secondary formations. Amongst its more valuable contents may be mentioned the collections of Dr. Mantell, the tertiary fossils collected by Dr. Falconer in India, and the remarkable fossil birds from New Zealand.

**Mineralogical Department.**—The minerals are contained in the table-cases in the geological gallery. They are arranged according to a chemical classification. Many valuable and unique specimens exist in the collection, which is rapidly increasing.

The expenses of the museum are paid by grants of public money. According to the estimates, £110,949 were required during 1879-80; £147,885 during 1887-88.

Admission to the museum was at first obtained by printed tickets, which were delivered by the porter to persons making a written application. There could be no more than 45 visitors, at the utmost, per day, under the regulations then in force. Now, all who present themselves are freely admitted; and every week-day the museum is visited by large numbers: as many as 45,000 holiday-folk have passed through the building in one day. During the past few years exhibitions have been given in the king's library, in connection with the centenaries of Luther, Handel, etc., and arrangements have been made for temporary exhibitions of rarities.

**BRITISH NAVY.** Under NAVIES, MODERN, will be found a brief description of the chief navies belonging to the continent of Europe, and to the United States of America. The British navy is separately treated in this place.

While the Romans occupied Britain, they were obliged to maintain a fleet of war-vessels on the coasts, to protect it from the ravages of the Saxons, who were the pirates and buccaneers of those times. When the Romans had departed, and the Saxons became dominant, the coasts were infested by another naval power—the Scandinavian vikings. It was Alfred the Great who first established what may be called a navy in this island, consisting of efficient vessels well manned, for protection, and not aggression. Ethelred made the building of a ship a condition for holding a certain acreage of land. William the Conqueror strengthened the navy by the institution of the Cinque ports (q.v.). During the first three centuries after the conquest, we read of British fleets of 240,400, and even 730 sail—a proof that the vessels must have been very small even if there were no exaggeration of numbers. Until 1485, the fleets were collected just as wanted; but in this year, Henry VII. conceived the idea of a *permanent* navy, to be ready at all times. He built the largest ship of the age, the *Great Harry*. Henry VIII. pursued the course established by his father, and still further strengthened the navy by instituting the admiralty, the navy-office, the Trinity house, and the dockyards at Woolwich, Portsmouth, and Deptford. The *Henri Grace de Dieu*, the largest ship built by him, was of 1000 tons burden; but most of the vessels were high, unwieldy, and narrow, with the guns nearly down to the water's edge. The ships of the navy presented an aggregate tonnage of 12,000 tons at the period of Henry's death. Elizabeth made a large increase in the navy; but they were not all royal ships which were sent to struggle against the Spanish Armada. James I. made many improvements in ship-building, by encouraging a distinguished naval architect, Phineas Pett. Charles I., who built the *Sovereign of the Seas*, of 100 guns, was the first to group the royal ships into rates and classes. Cromwell brought up the navy to the strength of 154 sail, including a large number of two-deckers. Charles II. allowed it to fall into decay for a time; but his brother, the duke of York, who afterwards became James II., not only restored it, but brought it to a higher state of efficiency and strength than ever. When William of Orange became king of England, he found a navy carrying 7000 guns and 42,000 seamen; he built many additional ships, some with as many as 80 guns, and established Plymouth dockyard. Queen Anne succeeded to the possession of a fine navy; which at her death had increased to 198 ships, mounting 10,600 guns, with a tonnage of 157,000 tons. George I. attended to the navy chiefly in repairing the ships after a period of war, and in supplying a new armament. George II. greatly added to the number of ships, established a naval uniform, and increased the renown of the British navy during the war against Spain.

The long and eventful reign of George III. was especially distinguished by the achievements of the navy. When he came to the crown in 1760, he found himself in possession of 127 ships of above 50 guns, and 198 of 50 guns and under, manned by 70,000 seamen. These numbers, by building and by capture, were increased to 174 and 203 respectively, by the end of the American war. Throughout the European struggle, from 1793 to 1815, the B. N. exhibited a spectacle for vastness and achievements which had never before been equaled in any country. In the first nine years of this period, between 1793 and 1802, England lost by war 5 ships of the line and 46 smaller vessels; but she captured from the French, Dutch, Spaniards, and Danes, in various battles, 74 ships of the line and 519 smaller vessels; or rather, four fifths of this number were captured, and one fifth destroyed. Besides these, more than 800 privateers were taken and destroyed by the English. Of the total number of captures, 144 ships of war were at once converted into British ships, and added to the navy. When war recommenced in 1803, England had 189 ships of the line, and 781 smaller ships of war; during the next seven years, the seamen varied from 100,000 to 120,000, and in 1810 the number was raised to 140,000. At all times, many of the ships of the royal navy are unemployed or out of commission; but it frequently happened during that great war, that England had 450 liners, frigates, and sloops, besides smaller armed vessels, employed simultaneously. The conquered vessels added to the navy between 1803 and 1815 were upwards of 100 in number.

After the termination of the great European struggle, a large number of ships or war were put "in ordinary," or out of commission, and their officers placed on half-pay. In 1820, the vessels in commission, in ordinary, and building, comprised 127 ships of the line, 311 frigates and sloops, and 27 smaller vessels; but in this total of 465, there were only 118 in commission. In the 19 years that next followed, almost wholly years of peace, the total number of ships of the line, frigates, and sloops, decreased; the gun-brigs, schooners, and cutters increased in number; while the first germs of a new element, a *steam navy*, made their appearance.

The year 1839 must be viewed as a turning-point in the history of the British navy. Twenty-four years of peace had thrown the memory of warlike achievements into the background; and the house of commons had insisted on the lessening of those estimates which provide for armies and navies. It was now found, however, that both Russia and France had accumulated formidable navies. From that year to the present, the B. N., in common with the navies of other powers, has been undergoing a series of "reconstructions." First, ships of larger size, and carrying heavier guns, were built. These ships were of immense power in the days of wooden broadsides, but are now useless for purposes of war. The next stage, from about 1858 to 1859, was the conversion of our force from a sailing to a steam navy. This became the era of great steam frigates of about 5000 tons, and of heavy armaments in a few great guns, of which the *Mersey*, 86 guns, may be taken as a leading specimen. With the introduction of rifled guns, of force hitherto undreamt of, came the necessity for armor-plated sides. The fighting part of the navy (i.e., the line of battle) changed once more after 1860 to low-sided vessels, clad in thousands of tons of iron plates. The *Warrior* was the first ship so built in England, and she was followed by a whole squadron similarly protected. Guns, however, went on increasing in offensive power; and whereas 5-inch plates were at first thought sufficient, now 10-in., 12-in., 14-in., and even 23-in. plates are necessary to exclude shot. Such a vast weight of armor all over a ship would sink any vessel of moderate dimensions. The principle of turret-ships is therefore becoming predominant, in which the greater part of the vessel, clad in comparatively light armor, is under water, or only just visible above the surface. The earliest formidable turret-ship was the ill-fated *Captain*, which, in 1870, capsized in the Bay of Biscay, and entombed 600 brave seamen, with the inventor, Capt. Coles. The expenditure on the B. N. greatly increased between 1839 and 1875, on account of the changes just adverted to. In 1896 the B. N. consisted of 86 armored ships carrying 745 heavy guns and 2,122 light guns; 128 unarmored ships carrying 746 heavy guns and 2,220 light guns; 2 armored gunboats carrying 4 heavy guns and 11 light guns; 85 unarmored gunboats carrying 214 heavy guns and 218 light guns; 4 dispatch vessels carrying 12 heavy guns and 18 light guns. In addition to these there were 29 training, receiving, store ships, etc., carrying 118 guns, and 250 torpedo boats. The total number of guns, exclusive of those on torpedo boats was 6,426, divided as follows: ten guns of 80 tons or over, 94 guns of 40 to 80 tons, 116 guns of 20 to 40 tons, 1,488 guns of 4 to 20 tons, and 4,718 guns under 4 tons. The number of officers was 2,861 and 53,755 seamen. In the marines the officers numbered 728 and the soldiers 17,430, making a total active list of 64,774 men.

Further matters concerning the ships, armament, seamen, or officers of the British navy will be found under ARMOR PLATES; MACHINE-GUNS; NAVAL RESERVE; NAVAL SCHOOLS; ORDNANCE; SHIPBUILDING; TURRET-SHIPS.

**BRITTANY.** See BRETAGNE.

**BRITTON**, the title of the earliest summary of the laws of England in the French language, purporting to have been written by the command of Edward I. The compiler is unknown.

**BRITTON, JOHN**, an eminent English topographical and antiquarian writer, the son of a small farmer and village shopkeeper, was b. July 7, 1771, at Kingston-St. Michael, near Chippenham, Wiltshire, and losing his parents young, received but a scanty education. Some short notices which he had contributed to the *Sporting Magazine* brought him into acquaintance with its publisher, Mr. Wheble, who employed him to compile the *Beauties of Wiltshire*, which he did in conjunction with a young literary friend named E. W. Brayley. They also prepared the *Beauties of Bedfordshire* in the same manner. B. afterwards issued a more elaborate work, entitled the *Architectural Antiquities of England*. One of the most important of his subsequent publications was *The Cathedral Antiquities of England*, 14 vols. fol. and 4to, 1814-35, with upwards of 800 highly finished plates. His illustrated works, alone, number 87. He d. in 1857.

**BRITZKA** (Polish *brjreska*, diminutive of *byrka*, a freight-wagon), a long four-wheeled pleasure carriage, in use in Russia and Poland, so constructed as to give space for reclining at night, when used on a journey. The Polish britzka, employed also in Russia, has a pole, a body of wickerwork and a leather top.

**BRIVE**, a t. of France, in the department of Corrèze, pleasantly situated in the midst of vineyards, and shut in by a fine circular avenue of elms, about 15 m. s.w. of Tulle. It has manufactures of woolen, cotton-yarn, etc. Pop. 15,000.

**BRIXEN**, a t. of Austrian Tyrol, at the confluence of the Eisack and the Rienz, 104 m. from Vienna by rail. It is a bishop's see, and has a cathedral, several monasteries, a theological seminary, and a gymnasium. There are iron and steel factories in the

neighborhood. Nine miles away is the great fort of Franzensfeste, built in 1838. B. is mentioned in 901; it was walled in in 1088; was burnt in 1174, 1284, and 1445; in 1519, it was stormed by the French, and in 1525 suffered from the rebellion of the peasants. Pop. '90, 5525.

**BRIXHAM**, a market-*t.* and seaport of Devonshire, England, beautifully situated on the s. side of Torbay, 5 m. s. from Torquay, and 22 m. directly s. from Exeter. The town occupies the sides of two hills, and is divided into two parts, called upper and lower B., the former consisting chiefly of a long straggling street. Some of the more recently erected parts of the town are well built, and contain good houses, but the older parts are mean. The prosperity of B. depends chiefly on its fisheries, it being the headquarters of the great Devonshire fishery of Torbay, in which many vessels are employed. Great quantities of fresh fish are sent to London, Bath, and Bristol. Considerable quantities of iron ore are raised in the neighborhood and shipped here. There is some shipbuilding, and the town is a much frequented seaside resort. B. has also a number of vessels engaged in the coasting and foreign trade, the foreign trade being chiefly with the Mediterranean. A cave discovered on Windmill Hill, in 1858, contained many remains of prehistoric animals and men. Near B. is a station of the South Devon branch of the Great Western railway. It was at B. that the prince of Orange, afterwards William III., landed, Nov. 4, 1688. Pop. '71, 4941; '91, 6224.

**BRIZA**. See **QUAKING GRASS**.

**BRIZURE**, **BRIZÉ** or **BRISÉ**, terms used in heraldry to indicate that a charge is bruised or broken.

**BROACH**, or **BROCHE**, an old English term for a spire springing directly from a tower without any intermediate parapet. Such spires are common in England, and in some places in Scotland, particularly in Fife.

**BROACH**, a *t.* in India. See **BAROACH**.

**BROAD ARROW**, a government mark, stamped, cut, or otherwise fixed on all solid materials used in her majesty's ships or dock-yards, and on government stores generally, in order to prevent embezzlement. The origin of the mark is obscure. Previous to the year 1698, the naval authorities prosecuted a dealer in marine-stores, for having in his possession certain stores bearing the B. A. of his majesty. The defendant allowed the evidence against him to go on, and when asked what he had to say, replied that it was *very curious* that the king and he, as a dealer, should both have the same private mark on their property! The receiver of stolen goods was acquitted, and this led to the passing of the act 9 and 10 Will. III. c. 41 (1698), which enacts that persons in possession of naval stores, or goods of any kind marked with the B. A., or other marks therein mentioned, and usually employed in marking naval stores for the navy, shall forfeit all such goods and £200, and also pay costs. The mark is for iron, wood, etc., what the color-thread is for sailcloth and ropes, which enables the government to identify the smallest piece of such articles.

**BROAD-BILL**. See **SHOVELER**.

**BROAD-BOTTOM ADMINISTRATION**, a name applied to the English ministry formed by Henry Pelham in 1744, because it professed to include all parties of weight and influence in the state in a grand coalition, and comprised no less than nine dukes—viz., Dorset, Newcastle, Montagu, Bedford, Grafton, Richmond, Argyle, Devonshire, and Bolton, the first seven of whom were of the cabinet. Besides the prime minister, Pelham, the other principal members of the cabinet were earls Gower and Harrington, the marquis of Tweeddale and lord Hardwicke. From this B. B. A. the particular adherents of Pulteney (newly created earl of Bath) and lord Carteret were carefully excluded. The ministry was dissolved in 1754, by the death of Pelham, though several of its original members had seceded long before.

**BROADCAST**, a method of sowing grain, which distributes it with some degree of uniformity over the surface. When the sowing is done by hand, the seed is carried in a bag at the left side, and is scattered with the right hand while the sower walks on with measured tread. The seed is afterwards covered with a harrow, or by dragging brush over it. Machines have been devised for sowing grain in this manner. The method of sowing by the drill is preferred by most intelligent farmers.

**BROAD CHURCH**, the name given to a portion of the Church of England which holds a position unidentified with either the High or the Low church party. The High Church branch holds rigidly to apostolic succession, maintains the divine right of episcopacy, and in general the sacramental view of the church and the Christian life; of this company are those known as "Ritualists," though not all who are High church would accept the name of Ritualists. (See **RITUALISM**.) From this section came those known some years since as "Puseyites." The Low Church section recognizes non-prelatical bodies of Christian believers as in some sense churches; in doctrine they are mainly Calvinists; they are often called Evangelicals. The Broad Church section is the latest of the three divisions, but has included a number of churchmen of high cultivation and talent, such as Dean Stanley, Canon Kingsley, Maurice, and others of note. The tendency of the Broad Church leaders is towards a liberal view both of Christian doctrine and church organization. Yet the High on the one hand, the Low on the other, and the Broad between the two subscribe to the same formularies, which they interpret

in differing senses, and from which they deduce opposite results. It should be understood that these names are used only colloquially for popular convenience, and are not accepted in either England or America as legitimate designations. They show tendencies.

**BROADHURST**, HENRY, b. Littlemore, near Oxford, England, 1840. The son of a journeyman stonemason, he was fourteen years old when he began to follow his father's trade. After a wandering life he settled down in London, 1866, became prominently identified with the Trades' union, was made sec. of the Trades' congress, in 1880 was elected to parliament from Stoke-upon-Trent, in 1885 from Birmingham, in 1886 from Nottingham, and in 1894 from Leicester; became under-secretary to the home office in 1886; and served on various commissions concerning working people.

**BROAD MOUNTAIN**, in the coal region, Carbon and Schuylkill cos., Penn. It is about 2000 ft. high and extends for 50 m. n.e. and s.w.

**BROAD RIVER**, a stream of North and South Carolina rising in the Blue Ridge, and joining with the Saluda, forming the Congaree. The city of Columbia is at the junction of the two rivers. The country around B. R. is exceedingly fertile and productive.

**BROADSIDE**, in naval warfare, is the simultaneous discharge of all the guns on one side of a ship of war. The fighting power of a ship is sometimes estimated by the weight of her broadside, i.e., the weight of all the shot and shell that can be fired off at once from one side or half of the ship.

**BROADSIDE**, OR **BROADSHEET**, a variety of pamphlet, consisting of a single large sheet, printed on one side only, and without division into columns. The broadside flourished chiefly in England, but had been in use from the first invention of printing, for papal indulgences, royal proclamations, and like documents. Throughout western Europe about the middle of the sixteenth century, the broadside made a considerable figure in times of political agitation. In England, it was used chiefly for ballads, which soon became so popular that during the first ten years of Elizabeth's reign the names of no less than forty ballad-printers appear in the Stationers' Registers.

**BROADSTAIRS**, a t. in England  $1\frac{1}{4}$  m. s. of North Foreland and 8 m. from Margate. It has a small pier built early in the 16th century, and an archway leading to the shore built in 1540. Near the pier is a chapel to the Virgin, in honor of which ships were once accustomed to furl their topsails as they passed. B. is a place of summer resort. Pop. 4300.

**BROADSWORD** is a sword with a broad blade, for cutting only, not for stabbing, and therefore not sharp at the point, like a sabre.

**BROAD TOP MOUNTAIN**, in Bedford and Huntingdon cos., Penn., 2500 ft. above the sea. It has large beds of bituminous coal.

**BROADUS**, JOHN ALBERT, D.D., LL.D., b. Va., 1827; educated in the university of Virginia; pastor of the Baptist church in Charlottesville, and in 1859 professor of New Testament interpretation and homiletics in the Southern Baptist theological seminary in Greenville, S. C. He was proficient as a Greek scholar, and published, among other papers, *The Preparation and Delivery of Sermons* and *Recollections of Travels*. D. 1895.

**BROBDINGNAG**, a mythical country described in Swift's *Gulliver's Travels*. The inhabitants of this wonderful country are represented as giants, about "as tall as an ordinary spire-steeple." Everything else is on the same enormous scale, whence the adjective *brobdignagian* has arisen as a synonym of gigantic. The name is frequently, though incorrectly, spelled *Brobdignag*. Swift wrote a mock letter from Captain Gulliver to his cousin Sympson, purporting to be dated April 27, 1727, but first published in 1785, in which complaint was made that Brobdignag had been wrongly printed for Brobdingrag, but this was only a feint to mystify the public by a pretended solicitude for minute accuracy. See SWIFT, JONATHAN.

**BROCADE**. This term is used to describe a silken fabric on which a figure of any kind is formed by the threads of the warp or weft being raised by the heddles, or, more generally, by the Jacquard-loom, in such order as to produce the pattern required. The word has much the same application to silk textures that damask has to linen textures or to worsted textures for upholstery uses. See WEAVING and JACQUARD-LOOM.

**BROCAGE**. See BROKER.

**BROCATELLE**, a kind of imitation brocade (q.v.), made of cotton or silk and cotton.

**BROCCOLI**, a well-known and much esteemed garden vegetable, one of the many varieties which cultivation has produced of the *brassica oleracea*, the common kale or cabbage. B. is said to have been originally brought to Italy and other parts of Europe from the isle of Cyprus about the middle of the 16th century. Its name is probably of Italian origin. It differs little from cauliflower (q.v.), of which it may be considered a mere variety, having colored instead of white heads, and a deeper tinge of color in the leaves, being also more hardy, the character from which its chief importance is derived, as it can be readily obtained at seasons when there is no cauliflower in the open garden. It is perhaps inferior to cauliflower, however, in delicacy of flavor. There are many subvarieties, the number of which is, of course, continually increasing; and some of these

are preferred for early spring sowing, with a view to an autumn crop; others for later sowing, with a view to a crop in the following spring. The subvarieties differ in size, in their more cut or entire leaves, in the greater or less degree of color—generally purple—with which the leaves are tinged, in the more or less compact form of the whole plant, in the more or less green, yellow, or purple color of the head, etc. Some of the kinds of B. preferred for late sowing and spring use are known by the general name of cape B., the first of them being said—but on doubtful authority—to have been introduced into Britain from the cape of Good Hope. The mode of cultivation of B. pretty much resembles that of cauliflower, except as to the times of sowing and transplanting, and that it is generally—even in Scotland—sown in the open ground, and not in a hot-bed. A similar richness of soil is required. Various modes of protection in winter are adopted. In mild winters, protection is scarcely or not at all needed.

**BROCCHI**, GIOVANNI BATTISTA; an Italian geologist, 1772–1826. He studied at Pisa, and was professor of botany in 1803 at Brescia, but devoted himself chiefly to geology. In 1806, he was made inspector of mines for Italy. In 1823, he went to Egypt, and two years after, Mehemet Ali made him one of a commission to organize the kingdom of Sennaar. B. fell a victim to the climate at Khartoum. Among his works are *Treatise on the Iron Mines of Mella*; *Essay on the Physical Constitution of the Metalliferous Mountains of the Valley of Trompia*; *Mineralogy of the Valley of Fassa and the Tyrol*; *Fossil Geology of the Apennines*, etc.

**BROCHURE**, a French word (from *brocher*, to stitch), equivalent to the English word pamphlet (q. v.).

**BROCK**. See **BADGER**.

**BROCK**, SIR ISAAC, 1769–1812, b. in Guernsey; an English general, killed in the battle of Queenston, Canada. Not long before he had captured Gen. Hull (suspected of treason) and his forces. There is a monument to his memory on the west bank of the Niagara river.

**BROCK**, THOMAS, English sculptor, born in Worcester in 1847. He became a pupil of J. H. Foley, and afterwards his assistant, completing after Foley's death many of his works; among others the O'Connell monument in Dublin. The bust of Longfellow in Westminster Abbey was by him. He was elected an associate of the Royal Academy in 1883.

**BROCKEN** (*Mons Bructerus*, *Melibocus* of the ancient Romans), popularly known as the *Blockberg*, is the highest summit of the Harz mountains. It is situated in the province of Saxony, Prussia, about 20 m. w.s.w. of Halberstadt, and has an elevation of 3740 ft. above the sea. The mountain is very frequently veiled in mist and cloud-strata, and is celebrated for the phenomenon known as the *Brockengespenst* ("specter of the Brocken"), which is nothing more than the shadow of men, houses, or other objects thrown upon the misty eastern horizon by the light of sunset. (See *Gallery of Nature*, published by W. & R. Chambers.) In clear weather, a fine view is obtained from the summit.

**BROCKHAUS**, FRIEDRICH ARNOLD, the founder of the well-known firm of B. in Leipzig, and publisher of the *Conversations-Lexicon*, was b. at Dortmund, May 4, 1772. In 1802, circumstances led him to Holland, where, however, his business schemes did not prosper. He returned to Germany in 1810, and in the following year commenced business in Altenburg. Before this, however (in 1808), B. had purchased the copyright of the *Conversations-Lexicon*, which had been commenced in 1796, and he completed the first edition, with the addition of two supplementary volumes, in 1809–10. In 1812, a second improved edition of the work was commenced under the supervision of B. as editor. The peace of 1815 enabled B. to pursue prosperously his peaceful and civilizing career. In 1817, his business had so increased, that he found it necessary to leave Altenburg for Leipzig, where, in the following year, he commenced book-printing in addition to book-publishing. In the course of a few years, the *Lexicon* passed through six editions; it has now arrived at the thirteenth edition. Through all the enterprises of B. as a publisher, a zealous devotion to the cause of liberty and general enlightenment may be traced. He died Aug. 20, 1823. B. was not only an able and assiduous man of business, but distinguished for his literary culture, his knowledge of the world, and his numerous social accomplishments. He was also eminently patriotic, and furthered many literary undertakings, simply through a pure love of "fatherland."

The business was afterwards carried on by FRIEDRICH (b. 1800, d. 1865) and HEINRICH (b. 1804, d. 1874) and then by Heinrich's sons, Rudolf and Edward. Among the numerous publications issued by the house, may be mentioned the later editions of the *Conversations-Lexicon*, with an *Atlas*; the *Universal Encyclopædia*, by Ersch and Gruber; and the German *Penny Magazine*, founded in 1833.

**BROCKHAUS**, HERMANN, third son of F. A. Brockhaus, was b. at Amsterdam, Jan. 23, 1806; studied at Leipzig, Göttingen, and Bonn, and lived successively in Copenhagen, Paris, London, and Oxford. From 1848 till his death in 1877, he held at Leipzig the chair of ordinary professor of the Sanscrit language and literature. Among his several works on oriental literature may be mentioned the *First Five Books of the Large Collection of Fables, Katha Sarit Sāgara*, in Sanscrit and German (1839); an edition of the drama *Prabodha Candrodāya*, by Krishna Misra, with Hindu scholia (1845); Nachschelbi's Persian version of the *Seven Wise Masters* (1845); and (in 1854) the Persian text of the *Songs of Hafiz*. After 1856, he was editor of the *Universal Encyclopædia*. B.'s method of printing Sanskrit in Roman types is not generally adopted in Germany.

**BROCKPORT**, a village in Monroe co., N. Y., on the New York Central and Hudson River railroad and the Erie canal, 18 m. w. of Rochester; has manufactures of pianos, wheels, shoes, etc. There is a state normal school here. Pop. '90, 3742.

**BROCKTON**, a city in Plymouth co., Mass., settled 1700, a town 1821, a city 1881; on the Old Colony system of the New York, New Haven and Hartford railroad, 20 miles s. of Boston, and watered by the Salisbury river. Its manufactures are important, especially those of boots and shoes, shoe-pegs, lasts, mechanics' tools, rubber goods, etc., and granite of fine quality is quarried here. There are electric railroads to all surrounding towns, electric lights, national and savings banks, excellent schools, a public library, and daily and weekly newspapers. Pop. '90, 27,294.

**BROCKVILLE**, a town of Ontario, Canada, taking its name from Gen. Sir Isaac Brock (q. v.). It stands on the left bank of the St. Lawrence proper, about 40 m. below Kingston, and about 160 above Montreal. Originally its communications downward were interrupted by powerful and rugged rapids, which, however, are now either avoided by canals or overcome by steam. B. is on the Grand Trunk railway. Pop. '91, 8798.

**BRODERICK**, DAVID COLBRETH, 1820-59; b. Washington, an energetic uneducated man, in early life a stone-mason, who became a political leader in New York city. In 1849, he went to California, and in 1856 was chosen United States senator. In consequence of some plain words, B. was challenged by David S. Terry, a judge of one of the state courts, and fell in the duel which followed.

**BRODERIP**, WILLIAM JOHN, 1789-1859; an English writer on natural history. He studied law, practiced, edited law reports, and was for 34 years a metropolitan police magistrate; but his leisure was devoted to science, and he was a member of most of the important societies, and contributed to their *Transactions*.

**BRODHEAD**, JOHN ROMEYN, LL.D., 1814-73; b. Philadelphia; a graduate of Rutgers college, and a student at law, but after brief practice he turned his whole attention to American history, especially that concerning the early settlement of New York. In pursuit of this object, while connected with the United States legation in Holland, he thoroughly searched the archives at the Hague and elsewhere in that country, and in England and France. His great labor was rewarded by the collection of more than 6000 documents, more or less important, of which many had until then been unknown to historians. These papers were printed by the state of New York in several large folio volumes. In 1846, B. was secretary of legation in London, where he wrote the greater part of his *History of the State of New York*, the last volume of which was published in 1871. From 1853 to 1857 he was naval officer of the port of New York. He was a leading member of the New York historical and other societies in this country and abroad.

**BRODIE**, Sir BENJAMIN COLLINS, Bart., a distinguished surgeon, third son of the Rev. Peter Bellinger Brodie, rector of Winterlow, Wiltshire, was b. there in 1783. He studied under sir Everard Home at St. George's Hospital, to which he was, in 1808, elected assistant-surgeon, and afterwards surgeon. He had previously lectured both on anatomy and on surgery. In 1810, he was elected a fellow of the Royal Society, and in 1811 received their Copley medal for his physiological papers contributed to the *Philosophical Transactions*. In 1834, he was created a baronet, and he held the appointment of sergeant-surgeon to queen Victoria, as well as that of first surgeon in ordinary to the prince consort. He was made D.C.L. of Oxford in 1850; was president of the Royal Society; a corresponding member of the Institute of France, and a foreign member of other learned societies and academies in Europe and America. Author of *Lectures on Local Nervous Affections* (1837, 8vo); *Hunterian Oration*, 1837; *Lectures Illustrative of Subjects in Pathology and Surgery* (1840, 8vo); *Introductory Discourse on the Duties and Conduct of Medical Students* (1843, 8vo); *Psychological Inquiries as to Mental Faculties* (3d ed., 1856); an edition of his works with *Autobiography* appeared in 1865. He also contributed papers to several scientific journals. He died in 1862.—B.'s son, sir B. C. BRODIE, F.R.S., was in 1855 elected Aldrichian prof. of chemistry at Oxford. He died in 1880.

**BRODY**, a t. of Galicia, Austria, s situated on a swampy plain, surrounded by forests, about 58 m. e.n.e. of Lemberg. B., which was made a free commercial town in 1779, has a large trade in the agricultural produce of the country with Russia, Poland, and Turkey. Its chief manufactures are leather and linen; jewelry, manufactured goods, and colonial produce are imported by way of Odessa. The trade is almost entirely in the hands of the Jews, who form so large a proportion of the inhabitants, that B. has been called "The German Jerusalem." Pop. 90, 17,534.

**BROG**, or BROGUE, a rudely formed species of shoe, formerly in use by the aboriginal Irish and the Scottish Highlanders, and of which there were different varieties. See SHOES, SHOE-TRADE. The name has been applied to a modern kind of shoes, with some fanciful peculiarities.—The term brogue is also used to signify the peculiar pronunciation of English that distinguishes natives of Ireland.

**BROGLIE**, ACHILLE LÉONCE VICTOR CHARLES, Duc de, 1785-1870; a peer of France. The family was Piedmontese, but won distinction in the armies of France. The first marshal de B. served under Louis XIV.; his son reached the highest grade of

the French peerage; the second marshal commanded in the seven years war, was made a prince of the empire, and by Louis XVI. made commander-in-chief. He refused to serve under Napoleon, and died in voluntary exile. His son followed Lafayette to America, but soon returned, served on the staff in the republican army of the Rhine, was denounced, arrested, and guillotined, June 27, 1794. His injunction to his son (the subject of this sketch, then but 9 years old) was to remain faithful to liberty even though she were ungrateful and unjust. "His father murdered, his mother in prison, his property confiscated and plundered, the young de Broglie first appears in life in wooden shoes and a red cap of liberty, begging an assignat from the younger Robespierre." Yet he adhered to the cause for which his father died, and maintained through life the principles of 1789, seeming to have forgotten even his rank until reminded of it by a summons to the chamber of peers. Early in life he was one of Napoleon's council of state. With high rank, independent fortune, unblemished integrity, unflinching patriotism, and a sincere and consistent attachment to liberal opinions, B. entered the chamber in 1815, just before he was 30 years old. His first opportunity was on the trial of marshal Ney, and he alone had the courage to speak and vote for acquittal on the ground that the marshal was not guilty of premeditated treason. During the restoration he was active in the defense of liberal opinions and measures, opposing the reactionary policy of the court, and acting with the doctrinaires, of whom Guizot was the ablest representative. In 1816, he married Mme. de Stael's daughter. About the same time he became an ally of Clarkson and Wilberforce in the cause of the emancipation of negroes from slavery. In Louis Philippe's first cabinet he reluctantly took the bureau of public worship, and in 1832, upon strong urging, became Cassimir Perier's successor as minister of foreign affairs, in which office he strengthened the bonds between France and England, negotiated the quadruple alliance, assisted in settling the Belgian and Greek questions, and labored with success to preserve the peace of Europe. In 1835, he was the head of the cabinet, and, riding beside the king when Fieschi's attempt at regicide was made, B. received one of the bullets through his coat collar. He retired permanently from public life in 1836. Though not in office, B. preserved through life close personal and political friendship with Guizot. The overthrow of the constitutional monarchy in 1848 was a severe blow to the duke; but he consented to sit in the republican assemblies, and labored to counteract some of what he deemed to be the evils of universal suffrage and to avert the *coup d'état* which he saw was impending. When it came he was conspicuous as one of the bitterest enemies of the imperial regime, though he admitted that an empire was "the government which the poorer classes of France desired, and the rich deserved." His last 20 years were devoted to philosophical and literary pursuits. With regard to the future, he said: "I shall die a penitent Christian and an impenitent liberal." He was a member of the academy and other societies.

**BROGLIE, CHARLES JACQUES VICTOR ALBERT**, Duc de, son of Achille, b. 1821; statesman and author, elected a member of the academy in 1862. He was elected to the national assembly in 1871; was appointed ambassador to Great Britain in the same year; and was premier of France in 1873-4 and 1877. His main work, *The Church and the Roman Empire in the Fourth Century*, has passed through several editions. He has also published Leibnitz's *System of Religion*; *Questions of Religion and History*; *Pontifical Sovereignty and Liberty*; *Divine Liberty and Human Liberty*; *Frederick II. and Maria Theresa*; *Empress Maria Theresa*; *Maurice de Saxe and the Marquis d'Arenson* (1891); *Memoirs of the Prince de Talleyrand* (edited 1891); *An Ambassador of the Vanquished* (1896), etc.

**BROGUE**. See BROG.

**BROHAN, JOSÉPHINE FÉLICITÉ AUGUSTINE**, 1824-93; a French actress, excelling specially in the higher dramas, such as those of Molière, Beaumarchais, and Victor Hugo. She produced some pieces of her own. On the death of Rachel she took the great tragedienne's chair in the Conservatory. Her mother, Augustine Suzanne (1807-87) was distinguished in comedy, and her sister, Émile Madeleine (b. 1833), was a talented and attractive actress; retired from the stage in 1885.

**BROILING** is a convenient and expeditious mode of cooking small pieces of meat, by laying them on a gridiron over a bright fire, or even on the coals themselves. This is perhaps the most primitive mode of preparing meat for eating, as may be supposed from the great ease and simplicity with which the operation is managed. B. is, in fact, a quicker sort of roasting. The albumen of the outside being sealed up at once, the meat is rendered extremely nutritious, and therefore this process is much to be recommended. But to broil meat so as to preserve its odor, juice, and fat, requires care. The meat should be prepared for the gridiron by being beaten slightly with the rolling-pin, trimmed of superfluous fat and skin, and cut so as to look well on the dish. The fire should be perfectly clear, and of a red-hot surface to answer to the size of the gridiron, that all parts of the meat may be equally cooked. Just before setting the gridiron over, some salt should be sprinkled on the fire to prevent the flare. The gridiron should be perfectly clean and smooth, being always rubbed when it is put away; and, before using, it should be warmed, greased with suet, and rubbed again with paper. When it is placed on the fire, the back should be higher than the front. The meat should never be touched with a fork, but turned rapidly with the broiling tongs; and when sufficiently done, should be served immediately on a very hot dish, being seasoned according to taste.



**BROKE.** Sir PHILIP BOWES VERR, 1776-1841; an English admiral of the war of 1812; he commanded the *Shannon*, and sent a challenge to fight to the American Capt. Lawrence, just promoted to the command of the *Chesapeake*. Before the letter arrived, Lawrence, who thought the mere appearance of a British vessel to be a challenge, went out to meet him. An action ensued, June 1, 1812, in sight of the land off Boston. Lawrence was almost immediately mortally wounded, and his badly supplied and badly manned vessel was captured. The victory raised B. to knighthood.

**BROKEN KNEES.** The part commonly termed the knee of the horse is the carpus or wrist of man, and from the peculiar conformation of a quadruped, is much exposed, and liable to serious injury. By *broken knee* is meant the abrasion or more serious injury of the joint by a fall; and even when the wounds are healed, the scar usually remains to indicate that the horse has once fallen, and is "broken-kneed." An animal is then regarded as unsafe, and seriously deteriorated in value.

*Causes.*—The fall is necessarily the immediate cause of the broken-knee; as to the cause of the fall, it is usually to be looked for elsewhere than in the horse himself. As a rule, the safety of a horse's action is very great, particularly about the age of from four to seven or eight years. Rarely does a horse at any age fall on his knees, unless his feet have suffered from improper shoeing; the animal then moves cautiously, and is very apt to "stumble." Undoubtedly, some horses of defective conformation and sluggish disposition are more likely to stumble and fall than a well made, high-actioned steed; nevertheless, the most perfect animal may gradually be rendered unsafe by improper shoeing. See SHOEING OF HORSES.

*Symptoms.*—It is important, so soon as the injury is done, to determine the extent and depth of the wound. If it be merely a superficial wound, the case is a simple one; and unless the skin is much bruised, the hair will grow, and the animal not be permanently blemished. The sheath, however, through which the tendon over the joint passes, may be opened, and the tendon itself injured. The wound is then gaping, heals rather slowly, and sloughs have to be thrown off. Lastly, the joint itself may be opened, and this is indicated by a free discharge of the joint-oil or synovia, and by the bones being seen or felt on probing. The worst form of accident is that when the bones of the joint are fractured. The system suffers when the wounds are serious, and severe fever sets in.

*Treatment.*—Whatever may be the form of injury, the first injunction is to wash the wound thoroughly with cold water applied constantly for hours. The joint will swell, become hot and painful, and in some cases irritative fever occurs. Then the animal should be kept on low diet, and be purged with four, five, or six drachms of aloes, according to its size, etc. Should the wound be deep, much dirt remaining in the tissues, a large linseed-meal poultice should be applied over the joint for a day or two, until free suppuration sets in. If this is retarded, and in all cases when the poultice does not appear necessary, cold fomentations may be continued, using either some infusion of chamomile, or one part of tincture of arnica to twelve of water, or one part of Goulard's extract to a similar quantity of water. The severe symptoms speedily subside, unless the bones are fractured or the joint otherwise seriously injured. Usually, the wound heals rapidly, the joint-oil ceases to flow; and in order to insure a contraction of the wound, mild astringent or caustic applications should be used, such as tincture of myrrh, sulphate of zinc lotion, or sulphate of copper in crystal rubbed over it. When the wound is thoroughly healed, the hair may not grow rapidly, even in parts where it should form; in this case its production may be accelerated by the use of a very mild cantharidine ointment, which should act as a mild irritant, but not as a blister. In some cases of severe broken knee, it is advisable to fix the limb so that the animal may not move the joint much. In veterinary jurisprudence, a broken knee is regarded as a *blemish*, not as an unsoundness.

**BROKEN WIND,** a disease or unsoundness of the respiratory organs of the horse, which, from the French *pousse*, was termed, by some of the old English writers on farriery, *pureiness*. The Germans term it *dämpfigkeit*, or asthma, though in many of their works it receives also the name of *herzschlägigkeit*, from a belief that it consists in palpitation of the heart. The nature of the malady is not well understood, though it appears in the form of difficulty in the act of expiration, the horse making an extraordinary or spasmodic effort to expel from the lungs the air which has readily entered them in inspiration.

*Symptoms.*—A broken-winded horse is usually an animal that does not thrive, is lean, and has a dependent belly, the muscles of which are unusually active as expiratory muscles. The characteristic symptoms are best observed when the horse is exercised, the breathing becoming very labored, the nostrils dilated, the eyes bloodshot, and even blue, showing imperfect purification of blood in the lungs. On watching the chest and flank, the ribs are observed very actively moved, and after collapsing, when the air is expelled from the lungs, are further depressed by a spasmodic jerk brought about by the abdominal muscles. A broken-winded horse has a bad cough, of the kind referred to by veterinarians as characteristic of unsoundness, and termed a *hollow cough*. When the animal is oppressed by fast work, or dragging a load up a hill, the pulse is excessively rapid, and the heart beats energetically. From this circumstance, it is regarded by some as a disease of the heart. Others have believed the diaphragm affected, but in reality it is the lungs, or the apparatus for expelling the air from these organs, that is at fault.

The diaphragm being a muscle of inspiration, it is probably in no way implicated. No doubt, when the heart is diseased, the function of breathing is sometimes much affected, but these are not the symptoms of the true broken-wind, any more than when the lungs are in part rendered impervious to air, and the act of inspiration is rendered short. This condition constitutes *thick wind*, and is often one of the remote results of inflammatory disease of the lungs.

**Causes.**—Low-bred horses are liable to B. W., especially if improperly fed on innutritious and bulky food, and at the same time kept at hard and fast work. It is a dietetic disease, and is due to the irritation in the stomach, caused by indigestible food, being reflected from the nerves of the stomach to those of the lungs—in the same way as with ourselves, disease in one tooth seems to set all the other teeth aching. As a matter of fact the nerves of the stomach and lungs have a common origin, and consequently are easily affected one through the other. This indirect irritation causes firstly spasm, and later on relaxation of the little muscles around the air-tubes; consequently too much air gets into the lungs, and causes pressure on the walls of the air-vesicles, terminating in wasting and rupture of them. The result of the destruction of air-vesicles is a lessened area for the aëration of the blood, and is followed by debility and loss of condition. On post-mortem examination we find the stomach much distended with food of a dry nature, and its walls thinned. The lungs are lighter in color, and float much more buoyantly than in health; little or no blood is seen in them, but they contain a large quantity of air, which makes them crackle when pressed.

**Treatment.**—The treatment of B. W. is very unsatisfactory; and we can only hope for palliation of the symptoms by keeping the alimentary canal in proper order, administering occasional purgatives, and feeding on a proper quantity of the best oats, which should always be bruised; also allowing the horse the best hay in spare quantities—viz., from 10 to 12 lbs. daily. Some veterinarians have vaunted their powers of curing this disease, and recommended large doses of camphor, digitalis, and opium; but these potent narcotics only operate for a very short time, and as their effects pass off, the symptoms return, and often with increased severity. We may say that B. W. is incurable; and horses very frequently drop down exhausted when at hard work, and die either from congestion of the lungs, hemorrhage, or simple suffocation.

B. W. is so bad a form of unsoundness that horse-dealers sometimes attempt, and even successfully, to hide the defect for the time they may be engaged in the sale of a horse, and this they do by causing the animal to swallow *shot or grease*. A certain portion of lead weighing in the stomach has a wonderful effect in diminishing the symptoms, which become again obvious enough for a few hours after the ruse has been practiced on some unwary purchaser.

**BROKER** (so called, from a Teut. and Slav. root, *brak* or *wrak*, signifying refuse, blemish; as if the function had originally been to select good articles of merchandise and reject blemished ones: the German term is *mäkler*, from *makel*, blemish), an agent employed to make bargains and contracts between other persons, in matters of trade, commerce, and navigation, for a compensation commonly called brokerage. Where he is employed to buy or sell goods, he is not intrusted with the custody or possession of them, and is not authorized to buy or sell them in his own name. In this respect, he differs from a factor, and he differs from an auctioneer in two particulars: a B. may buy as well as sell, but an auctioneer can only sell; a B. cannot sell personally at public auction, for that is the appropriate function of an auctioneer, but he may sell at private sales, which an auctioneer (as such) does not. A B. is strictly a middleman, or intermediate negotiator between the parties, and for some purposes, he is treated as the agent of both parties, but primarily he is deemed merely the agent of the party by whom he is originally employed. There are several sorts of brokers, such as stock-brokers, share-brokers, ship-brokers (q.v.), insurance-brokers, and bill-brokers (q.v.). Persons who appraise goods, sell or distrain furniture for rent, are also called brokers, although differing entirely in their occupations from the preceding commercial agents. The business of a pawnbroker (q.v.) is also of a different nature.

Brokers in London, must be admitted by the lord mayor and aldermen, paying £5 on admission, and a like sum annually, under a penalty of £100; but they are no otherwise subject to the control of the court of aldermen. A list is kept by the city of brokers admitted, and of those who have been convicted of fraud or disqualified.

In the United States, brokers are classified according to the nature of their business. In general, the word means a dealer in money or stocks; but besides the bill and note broker there are exchange, insurance, cotton (and other merchandise), pawn, real estate, and ship brokers. The B. receives a commission on his sales, or by a special agreement. Usually brokers do not disclose the names of their principals. There is an implied warranty in dealing with a broker that the thing he sells is all that it pretends to be, and if a bill sold be found a forgery, he is held responsible.

**BROKERAGE** is the remuneration or compensation allowed to a broker (q.v.).

**BROMBERG**, a t. of Prussia, in the province of Posen, 69 m. n.e. from the city of that name, is situated on the Brahe, about 6 m. from its junction with the Vistula. B. has manufactures of woollens, linen, chicory, tobacco, and Prussian blue; a large sugar-refinery, distilleries, breweries, potteries, and corn-mills. The *Bromberg canal*, by uni-

ing the rivers Netz and Brahe, connects the Oder and Elbe with the Vistula. Pop. of commune, 1890, 41,399.

**BROME**, a co. in the province of Quebec, Canada, on the Vermont border; 350 sq. m.; pop. '91, 14,709. The Green mountains occupy a portion of the county. Co. seat, Knowlton. The Southeastern railway passes through the co.

**BROME**, RICHARD, a minor English dramatist, who died about 1652, was in early life a servant to Ben Jonson. At what time he began his literary career is unknown, but his reputation grew rapidly; he had as friends, Dekker, Ford, and Shirley, and Jonson wrote some lines commendatory of Brome's comedy, *The Northern Lass*. He wrote twenty-four popular plays, one of which, *The Jovial Crew*, revived in 1819, is ranked next to *The Northern Lass* in excellence. Fifteen of these plays were comedies, original in plot, and introducing some very striking and realistic characters. Other plays were *The Court Beggar*, and, in collaboration with Heywood, *The Lancashire Witches*. Two volumes of his plays were edited by Alexander Brome, a contemporary poet, but not related. See his *Dramatic Works* (3 vols., 1878).

**BROME-GRASS**, *Bromus*: Gr. *bromos*, a kind of oat; a genus of grasses, very nearly allied to fescue (q.v.), with flowers in lax panicles, glumes many-flowered, the outer palea bifid at the extremity, and awned beneath, and the very short stigma growing from the face of the germen, beneath "a apex. The species are numerous, and some of them are very common British grasses—none more so than the Soft B. (*B. mollis*), an annual or biennial, which has very soft downy leaves, grows well on poor soils, and is readily eaten by cattle, but is not much esteemed by farmers, either for the quantity or quality of fodder which it yields. Its seeds have also the reputation of possessing deleterious or poisonous properties; and those of two other species of this genus, *B. purgans* and *B. catharticus*, the former a native of North America, and the latter of Chili, are said to be emetic and purgative. The whole subject of the existence of poisonous properties in the seeds of any of these grasses, requires further investigation. Soft B., although now disliked by farmers, was formerly sown as a fodder-grass, and its large seeds were even regarded as making hay more nutritious; so that there are some who view its present proscription as a thing which ought to be reconsidered, and who deem it not improbable that its weighty produce, both in foliage and seeds, and its adaptation to poor soils, may yet recommend it to the favor of agriculturists. Very similar to it are Smooth B. (*B. racemosus*), Field B. or Meadow B. (*B. commutatus* or *B. pratensis*, and *B. arvensis*), all of which seem very much to resemble it in their properties.—The Tall B. (*B. giganteus*, also known as *festuca gigantea* and *bucetum giganteum*), a native of Britain, which reaches the height of 4 or even 5 ft., affords a great bulk of foliage, but is not much relished by cattle. Naturally growing in shady places, it succeeds even in dense woods, and is sometimes sown to form covert for game.—Rye B. (*B. secalinus*) is generally regarded as a troublesome weed, especially in fields of rye. It is very abundant in some parts of Europe. In a young state it has a great resemblance to rye. Its seeds, which are large, retain their power of germination for years, and do not lose it by passing through the intestines of animal. Deleterious effects have been erroneously ascribed to bread made from rye, along with which these seeds have been ground.

**BROMELIA CEÆ**, a natural order of monocotyledonous plants, allied to *amaryllideæ* and *irideæ*, stemless, or with short stems, and rigid, channelled, often spiny and scaly leaves. The flowers are in racemes or panicles; the calyx 3-parted or tubular, persistent, more or less cohering with the ovary; the petals three, withering or deciduous, equal or unequal, imbricated in bud. The stamens are six, inserted into the tube of the calyx and corolla, the anthers opening inwards. The ovary is 3-celled, the style single, the fruit capsular or succulent, many-seeded; the seeds with a minute embryo lying in the base of mealy albumen.—The order contains about 170 known species, all natives of the warmer parts of America, although some of them are now naturalized both in Asia and Africa. The best known plant of the order, and the only one much valued for its fruit, is the pineapple (q.v.). B., with their strong spiny leaves, cover the ground in many places, so as to form impenetrable thickets. Many of them are epiphytic, or grow upon trees, without being parasites, particularly the species of *tillandsia*, one of which is the New Orleans moss, long beard, or old man's beard of the West Indies and of the southern parts of the United States, hanging from the trees like the lichens of colder climates. The leaves of some are so formed and placed as to retain near their base a quantity of water, often affording a delicious refreshment to the traveler in a hot climate. The water is, perhaps, of use to the plant itself in droughts. Not a few of the B. are capable of vegetating long without contact with earth, and of sustaining long drought without inconvenience, for which reason, and because of their beautiful and fragrant flowers, some of them are very frequently suspended from balconies in South America as air-plants. But the plants of this order are more generally valuable for their fibers than upon any other account. *Tillandsia usneoides*, the New Orleans moss already mentioned, yields a fiber, easily obtained, and in great abundance, which is used instead of hair for stuffing mattresses. The fibers of the leaves of the pineapple, and of some other species of this order, have been made into fabrics resembling the finest white muslin, whilst they are found also to possess sufficient strength for cordage. It is supposed that the produce of different species of *bromelia* is often included along with that of the American aloe or *agave* (q.v.), under the name of *pita* fiber or pita flax, the appearance and properties of

the fibers being very similar, as well as those also of the fibers of the species of *yucca*. The fiber of the pineapple is, in some countries, very frequently twisted into fishing lines, and made into nets and into ropes intended for immersion in water, being very little liable to injury from this cause. Abundant as the plant is in its native regions, and now so perfectly naturalized as to form thickets in many parts of the old world, there seems no limit to the quantity of this fiber which might be procured.—The pineapple cloth of the Philippines is called *pina muslin* and *batiste d'ananas*. It is also sometimes erroneously called *grass-cloth*. "With a magnifier, the fibers may be seen to be very numerous and fine, but not twisted at all, as in grass-cloth or the finest muslins and cambrics." The Philippine pineapple fiber is obtained from a species called by the Spaniards *pigna* or *pina* (a cone), and which has by botanists been named *bromelia pigna*, although some regard it as a mere variety of the pineapple, with small and rather dry fruit. It grows in great abundance in the Philippine islands, and is cultivated by the Chinese near Singapore, and the fiber exported to China. This fiber is prepared also in Malacca, Java, Celebes, etc. The fruit of *B. pinguin*, the wild ananas, affords a cooling juice, which is used in the West Indies, mixed with water, for various ailments.

**BROMIC ACID**,  $\text{HBrO}_3$ , is the best known compound of bromine and oxygen. It is prepared pure by acting on bromine,  $\text{Br}_2$ , with bromide of silver,  $\text{AgBrO}_3$ , when bromide of silver and  $\text{B. A.}$  are produced.  $\text{B. A.}$  is a very unstable acid, being readily decomposed by reducing agents. It forms a whole series of salts called bromates, none of which are of importance. They are mostly crystalline, but their watery solutions readily decompose when evaporated. When heated, they liberate oxygen and form bromides (see BROMINE). Mixed with sulphur or charcoal, they explode by percussion, and in this and other properties resemble the chlorates. See CHLORIC ACID.

**BROMIDES**. Bromine combines very rapidly with most of the metals, occasionally so as to cause ignition, as in the case of antimony, and forms a class of salts usually known as  $\text{B.}$ , though perhaps they are rather hydrobromides. (See HYDROBROMIC ACID.) Bromide of silver, which is very sensitive to the sun's rays, is used in photography. Bromide of potassium, which is the most important of the  $\text{B.}$ , may be prepared by the action of bromine on solution of caustic potash. The whole is then evaporated to dryness and ignited along with charcoal. On solution in water and crystallization, the bromide is obtained in colorless, cubical crystals, possessing a pungent saline taste, and which are very soluble in water. This salt has been used in a very large number of diseases, owing to its powerful sedative properties. Other  $\text{B.}$  (such as those of sodium and lithium) are of comparatively little importance, although they possess similar medicinal properties. Hydrobromic acid combines with these the tonic effects of hydrochloric acid. In epilepsy, bromide of potassium affords relief. As a sedative in nervous excitement and sleeplessness, its use produces beneficial results, while in delirium tremens and tetanus large doses give relief. In excessively large doses, general depression, lowering of the temperature, and even death may result. The continued use of bromine compounds in large doses often leads to unpleasant effects (skin eruptions, low spirits, etc.), collectively termed *bromism*. See HYPNOTICS.

**BROMINE** (Greek, *bromos*, disagreeable smell: symb.  $\text{Br}$ ; equiv. 80; spec. grav. 2.96), one of the chemical elements, occurs in combination in sea-water to the extent of about 1 grain to the gallon. It is found more abundantly in certain saline springs, especially those at Kreuznach and Kissengen in Germany. It is also present in water and land plants and animals. In the extraction of  $\text{B.}$  from concentrated sea-water, from which common salt has been separated in quantity, and which is then called *bittern*, or from salt springs, the liquor—which contains the  $\text{B.}$ , as bromide of magnesium,  $\text{MgBr}_2$ —has a stream of chlorine gas,  $\text{Cl}$ , passed through it, which forms chloride of magnesium,  $\text{MgCl}_2$ , and liberates the bromine. The liquid thus becomes of a more or less yellow tint, and if it be then agitated with ether, and allowed to settle, the latter floats up the bromine. The ethereal solution is then treated with potash, which principally forms bromide of potassium,  $\text{KBr}$ , and fixes the  $\text{B.}$ , so that the ether may be distilled off. The residue is then treated with oxide of manganese and sulphuric acid in a retort with heat, which results in the liberation and distillation of pure bromine. It exists as a deep red liquid of density 2.96 at  $59^\circ$  ( $15^\circ \text{C.}$ ), which evolves red fumes of a very irritating and suffocating nature. It is very poisonous, actually destroying the animal tissues. It is sparingly soluble in water, more so in alcohol and ether, and its water solution possesses great bleaching properties. When raised to the temperature of  $145.4^\circ \text{F.}$  ( $63^\circ \text{C.}$ ), it boils, and reduced to  $9.5^\circ$  ( $-12.5^\circ \text{C.}$ ), it becomes a red crystalline solid.  $\text{B.}$  combines with great rapidity with metals, occasionally with ignition, as with antimony, and forms a class of salts. Treated with hydrosulphuric acid,  $\text{B.}$  yields hydrobromic acid,  $\text{HBr}$ , which is the analogue of hydrochloric acid, as  $\text{B.}$  is of chlorine.

**BROMLEY**, a t. in England, 10 m. s.e. of London, on high ground n. of the Ravensbourne river. Besides modern institutions there is a college founded in 1666, by bishop Warner, for the residence and support of widows of clergymen. There is also a palace for the bishop of Rochester, to whom the manor has belonged since the time of Eihelbert; and in the garden attached is St. Blaize's well, which was of great fame before the reformation. Pop. of parish in '91, 21,685.

**BRONSEBRO**, a village of Sweden, in the län, and 27 m. s. of the town, of Calmar. It is celebrated as the place where treaties were entered into between Sweden and Denmark in 1541, 1641, and 1645.

**BRONSGROVE**, a market t. of Worcestershire, England, near the small river Salwarp, 12 m. s. w. from Birmingham. It is 1½ m. e. from a station on the Birmingham and Bristol railway. The Birmingham and Worcester canal also passes near it. It is situated in a highly cultivated and richly wooded valley. The principal street is about a mile in length. There is a very flourishing grammar-school, founded by Edward VI. in 1553. The linen manufacture was formerly carried on at B.; button-making and nail-making are at present the principal branches of industry. Pop. '91, 7984.

**BRONCHI** are the subdivisions of the trachea or windpipe. Opposite the third dorsal vertebra, the latter divides into two branches or B., of similar structure to itself—namely, round and cartilaginous in front; and flat, with muscular and fibrous tissue, behind, lined with mucous membrane. Of these B., one goes to each lung, the right being little more than an inch; the left, about two inches in length. On entering the substance of a lung, the B. divide into smaller branches, which again subdivide, until they are no larger in diameter than one-fiftieth to one-thirtieth of an inch, which give origin to, or terminate in, small polyhedral cells, which seem to cluster round their extremities, and open into them. These are the air-cells; they consist of elastic tissue, with a lining of mucous membrane, and beneath the latter, a layer of minute blood-vessels of the lung. See RESPIRATION, ORGANS AND PROCESS OF.

**BRONCHITIS**, or inflammation of the lining membrane of the bronchial tubes, is a disease of very common occurrence in this country, and one of the greatest importance for, if neglected, it not only destroys life, but if carelessly treated, may lead to premature and miserable old age. The first symptoms are generally those which distinguish a common cold—viz., shivering, headache, and sense of weariness, with occasional cough; but the cough continues, and recurs in paroxysms; there is a feeling of oppression on the chest, and the person *whoos* when he breathes. He also breathes more rapidly, six or ten respirations in the minute more than he did when in health, and his pulse is quicker; and the ear applied to his chest, after these symptoms have continued for two or three days, will hear a rattling, as if air was bubbling through thickish fluid, which is the case; he is breathing through an extraordinary amount of mucus secreted by the inflamed lining membrane of the tube. During his paroxysms of cough, this mucus is spit up. If the inflammation extend no further, it is termed *tubular B.*, and is seldom a fatal disease in the first attack; but, as may be expected, it will often extend, or, in some cases, begin in the small tubes—*vesicular B.*—when the symptoms just described will be present, but in a greater degree, the breathing being so embarrassed that the patient can no longer lie down, but requires to sit or stand up, and use all his muscles of respiration. Though he coughs, he spits very little, till about the third day, when he expectorates large quantities of yellow fluid. At last, prostration becomes so complete that he ceases to spit, and dies suffocated by the accumulated mucus, from the fifth to the seventh day. In less severe cases, or those which yield to treatment, the delicate tubes may be permanently injured by the inflammation. They may be thickened, which narrows their caliber; this will prevent the proper passage of the air, and gives rise to wheezing on any exertion, and cough, especially in winter. Moreover, after repeated attacks, one of the tubes may be blocked up entirely, so that the portion of lung to which it ought to conduct air, is no longer filled, and consequently collapses and wastes. This compels the adjacent tubes and air-cells to dilate to receive more air at the expense of their elasticity (emphysema, q. v.); the air cells may even burst, and so by degrees the apparatus for aerating the blood becomes less and less perfect. The treatment of B. must vary with the patient's constitution; but in most cases, counter-irritation, applied through the medium of mustard or hot turpentine fomentations, will be found very useful. These remedies act more rapidly than a blister, and may be frequently repeated. It should be remembered that patients suffering from B. are very easily depressed. Such medicines as ammonia should be given, to promote expectoration, combined with the liquor ammoniæ acetatis, to produce perspiration. In very acute cases, after a brisk purge, salines, with ipecacuanha or squills, may be given, and an emetic will remove accumulations of mucus.

In the B. of old persons, chloric ether will be found very useful, and may be combined with sedatives, as henbane; but opium must be given with great caution, or not at all, as it tends to increase the congestion of the inflamed tubes. The pargoric elixir (compound tincture of camphor) is an old and popular remedy in B., but enough has been said to impress on the reader the danger of tampering with bronchitis. In every case where it is possible, a skilled medical man should be employed, to determine, by the stethoscope, not only the disease but its exact situation; and as it is but too likely to recur at some future period, or symptoms caused by it to appear, a skilled opinion has a permanent value to the patient. See CATARRH.

**BRONCHO**. The name given in the western and north-western states to an imperfectly broken mustang. The word is more properly spelled *branco*, according to the Spanish form, and means "intractable," "rough," "stubborn." The name *cayuse* (from the Cayuse Indians) is also locally employed to designate the broncho.

**BROMCHOCLE.** See GOTTIE; THYROID BODY.

**BRÖNDSTED, PETER OLUF**, a learned antiquary, born near Horsens in Jütland, Nov. 17, 1780. On completing his course of studies at the university of Copenhagen, he, in 1806, went to Paris, where he remained two years. He afterwards visited Italy and Greece, where he made excavations which furnished valuable materials for the study of classical antiquity. He died rector of the Copenhagen university in 1842. B.'s principal work is *Travels and Researches in Greece* (2 vols., Paris, 1826). In addition to several smaller archaeological papers, amongst which was one in English, entitled *An Account of some Greek Vases found near Vulci* (Lond. 1832), and another on the bronzes of Siris, which appeared at Copenhagen, 1837, B. also wrote some valuable contributions to Danish history from mediæval Norman manuscripts (2 vols., Copenh. 1817-18).

**BRONGNIART, ADOLPHE THÉOPHILE**, 1801-76; b. Paris; eminent botanist, and son of Alexandre, noted below. He studied medicine, and in 1826 received a diploma, but devoted himself particularly to plants and their physiology. In 1833 he became professor of botany at the Jardin des Plantes, Paris, and in 1834 a member of the Academy of Sciences, succeeding Desfontaines. In 1852 he was elected a foreign member of the Royal society of London. He published *Prodromus of a History of Fossil Vegetables* (1828); *Botanical and Geological Researches on Vegetables enclosed in the Different Strata of the Earth* (3 vols., 1838); *Observations on the Interior Structure of the Sigillaria Elegans*.

**BRONGNIART, ALEXANDRE**, an eminent French chemist and naturalist, born at Paris in 1770, is said to have delivered a lecture on chemistry before he was 15. In 1790, he visited England for a scientific examination of the Derbyshire mines and pottery-works, and, on his return to France, published a *Mémoire sur l'Art de l'Émailleur*. Appointed in 1800 director of the porcelain manufactory at Sèvres, he held that office for the remainder of his life, and revived the almost lost art of painting on glass. In his *Essai d'une Classification des Reptiles*, 1805, he established the four divisions of reptiles, and first gave them the names of *saurians*, *batrachians*, *chelonians*, and *ophidiens*. His *Traité Élémentaire de Minéralogie*, published in 1807, at the instance of the imperial university, became a text-book for lecturers. In 1814, appeared his *Mémoire sur les Corps Organisés Possibles nommés Trilobites*, a name which, as well as a basis of classification for those singular crustacea, naturalists owe to Brongniart. In 1815, he was elected a member of the academy of sciences of the French institute; he was also a member of the royal and geological societies of London, and of other learned bodies. In 1845, appeared his *Traité des Arts Céramiques*. He died Oct. 7, 1847.

**BRONI**, a t. of northern Italy, in the province of Pavia, about 11 m. s.e. of the town of Pavia, in a beautiful situation at the foot of the Apennines. It has a singular old church, some portions of which date from the 10th century. In its vicinity is the castle of Broni, celebrated in history as the place where prince Eugene obtained a victory over the French in 1708. Pop. about 5100.

**BROMKHORST, JAN VAN**, 1608-80; b. Utrecht, Holland; attained success as a glass painter, but in 1639 abandoned it for oil painting and etching.

**BROWN, HEINRICH GEORG**, a German naturalist, was born at Ziegelhausen, Mar. 3, 1800, and educated at Heidelberg university, where he devoted himself to the science of forests and natural history. In 1828, he commenced at Heidelberg a course of lectures on the physical and industrial sciences, and in 1833 was nominated ordinary professor of the same. After Leuckhardt's departure from Freiberg, B. was appointed to the zoological lectureship. B. wrote several important scientific treatises. His first was *A System of Antediluvian Conchylia* (Heidelberg, 1824), which was followed by *A System of Antediluvian Zoophytes*. In 1824, he visited the southern countries of Europe; and in 1827, made a second journey to Italy. On his return, he published the results of his journey (2 vols., Heidelberg, 1825-30). In 1834 appeared his most important geological work—*Lithæa Geognostica*; in 1841-49, his *History of Nature*; and in 1850, his *Universal Zoology*, which was the first attempt to develop zoology in its entirety with reference to extinct organisms. B. died in 1862.

**BROWNER, JOHANN PHILIPP**, 1792-1864; a German authority on wines, their nature and production, on which he published more than a dozen treatises. In 1831, he established a school for teaching wine-culture; and in later years, under a commission from Baden, he traveled and investigated in all the grape-growing countries of the continent.

**BRONTÉ**, a t. in the province of Catania, Italy, situated at the western base of Mt. Etna, about 22 m. n.n.w. of the city of Catania. B. has manufactures of woolen and paper, and the district produces oil, almonds, wine, etc. But the town is celebrated chiefly for its connection with admiral lord Nelson, who was created duke of Bronté by the Neapolitan government in 1779, with an annual income of 6000 *oncie* (or \$18,750), Pop. about 16,000.

**BRONTÉ, ANNE**, b. about 1820; d. 1849; English novelist, and sister of Charlotte Brontë. With her sisters she published a volume of verse in 1846, assuming the pen-name of Acton Bell; and in 1847 and 1848 published the romances *Agnes Grey* and *The Tenant of Wildfeld Hall*.

**BRONTË, CHARLOTTE**, one of the most distinguished of modern novelists, was born at Thornton, in the West Riding of Yorkshire, on the 21st of April, 1816. Her father, a clergyman of Irish descent, removed, with six young children and an invalid wife, from Thornton to Haworth, in the same county, in 1821. Soon after their arrival, Mrs. Brontë died, so that Charlotte, trying hard in after-life, could but dimly recall the remembrance of her mother. Her father, eccentric and solitary in his habits, and full of extravagant theories for making his children hardy and stoical, was ill fitted to replace a mother's love. When Charlotte was eight years old, she was sent with three of her sisters to Cowan's Bridge school, which, whether deservedly or not, had an unfortunate notoriety conferred upon it 25 years later in the pages of *Jane Eyre*. Her two eldest sisters falling dangerously ill, and dying a few days after their removal thence, and the low situation evidently disagreeing with Charlotte's health, she was sent home when little more than nine, and remained there, "the motherly friend and guardian of her younger sisters," till, in 1831, she was sent to Miss Wooler's school at Roe Head, where her remarkable talents were duly appreciated by her kind instructress, and friendships formed with some of her fellow-pupils that lasted throughout life. A few years later, she returned to Miss Wooler's school as teacher there, and also had some sorrowful experiences as governess in one or two families. It was with a view of better qualifying themselves for the task of teaching that Charlotte and her sister Emily went to Brussels in 1842, and took up their abode in a *pensionnat*. When Charlotte returned home in 1844, a new shadow darkened the gloomy Yorkshire parsonage. Her father's sight was declining fast, and her only brother was a source of continual anxiety. It now seemed plain that school-keeping could never be a resource, and the sisters turned their thoughts to literature. Their volume of poems was published in 1846; their names being veiled under those of Currer, Ellis, and Acton Bell, but it met with little or no attention. Charlotte's next venture was a prose tale, *The Professor*, and while it was passing slowly and heavily from publisher to publisher, *Jane Eyre* was making progress. In the Aug. of 1847, it was submitted to Messrs. Smith & Elder, and published by them two months later. It took the public by storm. It was felt that a fresh hand, making new harmonies, was thrown over the old instrument. Henceforward, Charlotte B. had a "twofold life, as author and woman." Over the latter the clouds closed thicker and thicker. Mr. Brontë had indeed recovered his sight; but the sister Charlotte so intensely loved, and whose genius she ever delighted to exalt above her own, Emily—the Ellis Bell of *Wuthering Heights*—died in 1848. Her only brother also died in the same year; and Anne, the youngest of the family, following in 1849, Charlotte was left alone with her aged father in that dreary deserted home among the graves. Nevertheless, her energy never flagged. *Shirley*, begun soon after the appearance of *Jane Eyre*, was published in the autumn of 1849; and *Villette*, written under the frequent pressure of bad health and low spirits, came out in 1852. In the spring of 1854, Charlotte B. was married to her father's curate, the Rev. A. Nicholls, who had long known and loved her. It is a relief to find that a little bright sunshine was permitted to the close of a hitherto clouded life. It was, however, but brief; for serious illness set in, and on the 31st of Mar., 1855, she died. A fragment of an unfinished novel appeared in the *Cornhill Magazine* for April, 1860. See Mrs. Gaskell's *Life of C. B.* (1857); Shorter's *Charlotte Brontë and her Circle* (1896).

**BRONZE** is a reddish-yellow, fine-grained alloy of copper and tin, in variable proportions. It was early known, and what is usually spoken of as *brass* in regard to the ancient nations, was in reality bronze. The brass or B. referred to in the Bible was probably composed of copper and tin, though some translators consider it likely to have been copper alone. The examination of the most ancient coins and metallic ornaments and implements leaves no doubt as to the acquaintance of the ancients with B.; so much so, that in the antiquarian history of European nations, there is a distinct period styled the *bronze period* (see next art.). At the present time, B. is largely used for house and church bells, Chinese gongs, ordnance or cannon metal, and speculum or telescope metal. In the preparation of the various kinds of B., great care must be taken to keep the tin from being burned away or wasted. To obviate this, it is customary to use much old B., as worn-out cannon, etc., and when that is fused in the furnace, to add the new copper and tin. The best Cornish and Banca tin are employed for the better kinds of castings, especially where strength of alloy is required. For inferior work, old scrap tin, which often contains lead, is used; and where strength of material is not an object, a little zinc and lead are added. In either case, during the fusion of the mixed metals in the furnace, at a high temperature, as little air as possible must be admitted to the furnace, otherwise the metals are oxidized, and the alloy is deteriorated. B., when well made, is, excepting gold, platinum, and some of the rare metals, the most durable metallic material with which we are acquainted; and this, coupled with its extreme hardness, rendering it difficult for time and ordinary wear and tear to efface inscriptions or medallions stamped on it, has led the mint in France, some years ago, to issue a bronze coinage in place of copper; and for the last twelve or fifteen years bronze coinage has taken the place of a copper coinage in Great Britain.

The principal varieties of B. have the following average composition:

		Copper. Tin.	
Ancient.	Brass ordnance or bronze cannon.....	9	1
	Bronze for toothed wheels.....	10	1
	“ for mathematical instruments.....	12	1
	“ for bearings of machinery.....	8	1
	Chinese gongs and cymbals.....	5	1
	Musical bells.....	6	1
	House bells.....	4	1
	Large bells.....	3	1
	Telescope or speculum metal.....	2	1
	Mirrors.....	2	1
	Hard bronze.....	7	1
Ancient.	Medium bronze.....	8	1
	Soft bronze.....	9	1
	Flexible bronze nails.....	20	1

Recently, B. has been deposited on small statues and other articles, in greater or less thickness, by the electrolytic process (see GALVANISM), forming very pleasing ornaments at a cheaper rate than ordinary B. ornaments can be purchased for. The same process has been suggested for coating those parts of machinery which are liable to rust.

**BRONZE, AGE OF** (*Dan. Broncealderen*), a term used by many modern archæologists to distinguish the second of the three successive periods into which, as they hold, the primitive or pre-historic antiquities of a country may be divided. They take for granted that among a rude or savage people, stone, being more easily fashioned, would come into use before any kind of metal; and that of metals, copper, being oftener found ready for the hammer, would come into use before iron, which has generally to be smelted before it can be wrought. These assumptions—which, in so far, are only in accordance with what has actually been observed among uncivilized races—have obtained from a very early date. Lucretius, writing in the century before the Christian era, has recorded them with his usual vigorous precision:

*Arma antiqua, manus, unguis, dentesque fuerunt,  
Et lapides, et item silvarum fragmina rami:  
Posterior ferri vis est serisque reperta;  
Et prior seris erat quam ferri cognitus usus.*  
*De Rerum Natura, v. 1282.*

Man's earliest arms were fingers, teeth, and nails,  
And stones, and fragments from the branching woods;  
Then copper next; and last, as later traced,  
The tyrant iron.—*Mason Good's Translation.*

More than one antiquary of the last century appears to have suggested the distribution of archæological objects into eras of stone, of copper or bronze, and of iron. But the proposed classification received scarcely any attention until about forty years ago, when it was adopted and developed by Mr. C. J. Thomsen, superintendent of the ethnographical and archæological museum of Copenhagen, in his *Ledetraad til Nordisk Oldkyndighed* (Kjøbenhavn, 1836), and by Mr. Nilson, professor of zoology in the university of Lund, in Sweden, in his *Skandinaviska Nordens Urinvonare* (Lund, 1838-49). According to the theory of these writers—which is held by almost all archæologists in Denmark, Sweden, and Norway, by many in northern Germany and in Switzerland, and by a few in other parts of Europe—the first three stages in the progress of a nation from barbarism to civilization are as clearly identified and defined by their relics of stone, of bronze, and of iron, as the comparative antiquity of geological strata, or periods of the world's creation, is determined by the fossils which they are found to contain.

The name of the “age of stone” is given to the period when weapons and implements were made of stone, amber, wood, bone, horn, or some such easily wrought material, and during which very little or nothing was known of metals. During this era, the people, few in number, and savage in their habits, clothed themselves chiefly with skins of animals. They buried their dead in large sepulchral chambers, covered by what have been called *cromlechs*, or girdled round by the unhewn stone pillars called “Druidical circles.” The bodies have most frequently been found unburned, and often with rude urns beside them.

During the “age of bronze,” weapons and implements were made of copper or of bronze, and iron and silver were little or not at all known. The dead were burned, and their ashes kept in urns, or deposited in stone-chests, which were covered by conical mounds of earth or heaps of loose stones. In the urns, articles of gold and amber are found, but never of silver. Most articles of metal appear to have been cast; where marks of the hammer appear, it is contended that the forging or beating must have been done by a stone hammer upon a stone anvil.

The “age of iron” is the name applied to the third and last of the three supposed periods. During this era, it is conceived that iron displaced bronze in the manufacture of weapons and implements, and that silver and glass came into use. The dead were still occasionally burned; but they were frequently buried without burning, often seated on chairs, and, at times, with a horse in full war-harness laid beside the body of his master.



The Scandinavian and German antiquaries admit that their three periods run, more or less, one into another; that stone weapons continued to be used throughout the age of B.; that B. and gold were not unknown in the age of stone; and that weapons of stone and B. continued to be used in the age of iron. This admission obviously detracts very much from the practical value of the classification for chronological or other scientific purposes. But the late Mr. J. M. Kemble, and other British antiquaries, have taken objections to the classification altogether, as irreconcilable with generally admitted facts, when carried out to its strict and necessary consequences. They point to the every-day discovery of objects of stone, B., and iron, in the same ancient urns, graves, and dwellings. They instance the case of the Huns, who had swords of iron, while they pointed their arrows with bones; the case of the Anglo-Saxons, who fought with stone mauls at Hastings; and the case of the Germans, who used stone hammers in the thirty years' war. They show stone weapons, in some of which the traces of metal are still fresh, while others attest for themselves that they could not have been cut but by a thin sharp metal point.\* They prove from Greek and Roman writers that the nations of the n. and w. of Europe used iron weapons during what must have been their B. age. And they repudiate the proposed appropriation of different modes of burial to the different ages—a point on which the supporters of the theory appear to be hopelessly divided among themselves—on the ground that graves assigned to the B. period have been found to contain more iron than B., and that other supposed characteristics of sepulchers of the B. age are quite as common in sepulchers of the iron age. But although the threefold classification of the Scandinavian and German archæologists cannot be relied upon for historical uses, it may be accepted as a very convenient mode of arranging archæological objects. It has been adopted, with some modifications, in the gallery of British antiquities in the British museum at London, in the national museum of the antiquaries of Scotland at Edinburgh, in the museum of the royal Irish academy at Dublin, and in other collections. For implements of bronze age, see illus., *ARCHÆOLOGY*, vol. I., figs. 7, 8, 18, 19, 87.

**BRONZE-WING, BRONZE-WINGED PIGEON, and BRONZE PIGEON**, names given in the Australian colonies to certain species of pigeon (see *PIGEON* and *COLUMBIDÆ*), chiefly of the genus *peristera* of Swainson, on account of the lustrous bronze color with which their wings are variously marked. They are otherwise also birds of beautiful plumage.—The **COMMON B.** or bronze-winged ground dove (*columba* or *peristera chalcoptera*) is distributed over all the Australian colonies. It is often seen in flocks, feeds on the ground, and builds its nest chiefly on low branches of trees growing on meadow-lands or near water. It is a plump bird, often weighing fully a pound, and is acceptable at every table.—The **BRUSH B.** or little bronze pigeon (*C.* or *P. elegans*) is not so plentiful nor so widely distributed, chiefly inhabiting Tasmania and the southern parts of Australia. It inhabits low swampy grounds, never perches on trees, resembles a partridge in its habits, and makes a loud burring noise like a partridge when it takes wing on being alarmed.—The **HARLEQUIN B.** (*C.* or *P. histrionica*) is found in the n.w. parts of New South Wales in great flocks, feeding on seeds.—Some of the species of *geophaps*, another of the genera or sub-genera of the *columbida*, are also sometimes called bronze-wing. Their partridge-like appearance and habits have gained for them the name of partridge pigeon (q. v.).

**BRONZING** is the process of covering plaster or clay figures, and articles in ivory, metal, and wood, so as to communicate to them the appearance of ordinary bronze. Several of the materials employed are of little value, whilst others are expensive. Thus, *gold powder* is used for the finer work, and is prepared by grinding gold-leaf with honey on a stone slab till a very fine state of division is attained, then washing out the honey, and drying the gold powder. Inferior gold-leaf, or that which contains much silver and copper, yields the *German gold powder* employed in bronzing. *Copper powder* is prepared by introducing an iron bar or plate into a solution of copper, when the latter metal is precipitated as a finely-divided red powder. *Mosaic gold*, or *mustum*, is made by fusing 1 lb. of tin, introducing  $\frac{1}{4}$  lb. mercury, allowing the alloy or amalgam to cool, then pulverizing and grinding up with  $\frac{1}{4}$  lb. sal-ammoniac, and 7 ozs. sublimed sulphur. Ultimately, the whole is subjected to the process of sublimation, when the tin, as a brilliant yellow powder, resembling gold, is left in the subliming vessel. The color of mosaic gold may be deepened by the addition of red oxide of lead, and it then assumes a copper tint. *Gold size* is prepared by heating 1 lb. of linseed oil, and gradually adding 4 ozs. of gum animi in very fine powder. When boiled sufficiently, it assumes the consistence of tar, and may then be strained through cloth. When employed in bronzing, some vermilion is added, to make it opaque, and turpentine,

\* M. Frederic Troyon, of Lausanne, one of the Swiss antiquaries who accept the three periods of their Scandinavian brethren, instances certain stone axes (now in the collection of baron Remberg, at Prague), which were found, along with their cores, at the site of a primitive manufactory of these weapons in Bohemia. "These cores," he says, "when replaced in the holes from which they had been taken (easily verified by the corresponding veins of the stone), left so little play-room, that it was evident they could only have been detached by a metal point, and not by a hollow cylinder, which could not have given to the hole its conical form, now quite apparent. Instead of the soft iron which is employed nowadays in such operations, the ancients used copper or bronze; and, of course, water and silicious sand were likewise employed in the process."

to make it thin and limpid enough to be easily laid on the plaster cast or other article with a brush, and the object may ultimately be rubbed over with soft chamois leather, which is occasionally dipped into the gold size. The other B. powders are best laid on with a solution of gum-arabic or isinglass, either of which acts as a cement.

Gun-barrels are bronzed by acting upon them with the chloride or butter of antimony (*bronzing salt*), or with hydrochloric or nitric acids, when the surface of the iron gets partially eaten into, and covered with a thin film of oxide; after which the gun-barrel is thoroughly cleaned, oiled, and burnished. A brownish shade is thus communicated to the barrel, which protects it from rust, and at the same time renders it less conspicuous to an enemy or to game. In the bronzing operation known as the Damascus, the barrel is treated with dilute nitric acid and vinegar, to which sulphate of copper has been added. The result is, that metallic copper is deposited irregularly over the iron surface; and when the latter is washed, oiled, and well rubbed with a hard brush, a very pretty appearance is communicated to the barrel. Articles in wood that require to be bronzed, are first coated with a mixture of size and lampblack, and dried, and then a bronze powder, consisting of very finely-divided patent yellow, raw umber, pipe-clay, lampblack, and Prussian blue, is put on with a brush. After being dried again, the article is burnished with cloth of leather, covered with a layer of Castile soap, and, lastly, cleaned up with a woollen cloth. Copper vessels, coins, etc., are bronzed by heating them in a copper boiler containing vinegar, with 2 parts of verdigris, 1 of sal-ammoniac dissolved in it, when, after sufficient boiling, a pleasant reddish-brown hue is imparted. Bronze and copper articles may have an antique appearance communicated by applying a solution of sal-ammoniac 1 part, cream of tartar 3, common salt 6, hot water 12, and more or less nitrate of copper, when an ancient greenish hue is obtained.

**BROOCH** (from a root signifying to pierce; comp. Eng. *to broach*; Fr. *broche*; .so spit, or to stitch; Wel. *broc*, to stab), an ornamental pin or instrument for fastening the dress, consisting for the most part either of a ring or disk or of a semicircle, there being a pin in either case passing across it, fastened at one end with a joint, and at the other with a hook. Brooches were much used in antiquity, and varied in form as much as in modern times. They were worn both by men and women, and with a view both to ornament and use, from the time of Homer to the fall of the western empire. Nay, in the early portion of the middle ages, and even amongst semi-barbarous tribes, the art of making *fibula* seems not only to have flourished, but to have attained marvelous perfection. Many of those found, both in Ireland and in Scotland, are wonderfully beautiful in workmanship, and still more so in design.

**BROOKE**, a co. in West Virginia, in the "Panhandle"—a narrow strip between Ohio and Pennsylvania; 84 sq.m.; pop. '90, 6660. Surface hilly, soil fertile; productions agricultural, coal, and natural gas. The Pittsburg, Cincinnati, Chicago, and St. Louis railroad passes through it. Co. seat, Wellsburg.

**BROOKE, FRANCIS J.**, 1768–1851; a Virginian, an officer in the revolutionary army, speaker of the Virginia senate, and presiding judge of the court of appeals.

**BROOKE, HENRY**, dramatist and novelist, was b. about 1703, at Rantavan co., Cavan, Ireland. His father was a wealthy clergyman. In 1720 he entered Trinity College, Dublin, and in 1724 he went to study law in London, and became the chosen friend of Pope and Lyttleton. He was recalled to Ireland by a dying aunt who left him guardian of her daughter, a child of twelve, whom he afterwards married, and with whom, five or six years later, he returned to London. Here he published (1735) *Universal Beauty*, a poem, and in 1739 a play, *Gustavus Vasa*, full of the noblest sentiments, which was, however, prohibited at Drury Lane and was afterwards produced in Dublin as the *Patriot*. In 1740 Brooke was taken ill and returned to Ireland, where he published several books and a tragedy, *The Earl of Westmoreland*, which was performed at Dublin, but sank into a state of mental debility and died at Dublin, Oct. 10, 1788. The sonorous eloquence of his plays has not saved them from oblivion; and his novel, entitled *The Fool of Quality*, is the only work of his which is likely to meet the eyes of modern readers. It was originally published in five volumes, and was greatly admired by John Wesley. A new edition was published in 1859, with a preface by the Rev. C. Kingsley.

**BROOKE, Sir JAMES**, rajah of Sarawak, and governor of Labuan—a man strongly imbued with the spirit of the old adventurers of the Elizabethan time—was b. at Coombe Grove, near Bath, 29th April, 1808. He early entered the East India army, was seriously wounded in the Burmese war, and returning home on furlough, spent some time in travel on the continent. Shipwrecked on the voyage out to join his regiment, he was unable to reach India before his furlough had expired; his appointments consequently lapsed, and he quitted the service. He now conceived the idea of putting down piracy in the Eastern archipelago, and of carrying civilization to the savages inhabiting these islands. He purchased a yacht, which he manned with about 20 sailors, and after a three years' cruise in the Mediterranean, to test the sea-worthiness of his vessel and the seamanship of his crew, sailed from London for Sarawak, a province on the n.w. coast of Borneo, Oct., 1838. When he arrived there, Muda Hassim, the uncle of the sultan of Borneo, was engaged in a war with some rebel tribes. B. lent his assistance, and in return had the title of rajah and governor of Sarawak conferred upon him, the native

governor being forced to resign. B. immediately set about reforming the government, instituted free trade, and framed a new code of laws. The murderous custom of head-hunting, prevalent among the Dyaks, he declared to be a crime punishable with death, and vigorously set about the extirpation of piracy. This was done so draconically as to occasion great dissatisfaction in this country; and the result was, that parliament abolished the "head-money" that had been previously paid for the slaughter of pirates. Certain charges, however, brought against B. in the house of commons, in connection with this matter, were declared by a royal commission to be unsubstantiated. The head-money was received, not by B. and his associates, but by the British ships-of-war that had co-operated with him. On his return to England, B. received a warm welcome, was created a knight commander of the Bath in the year following; and the island of Labuan, near Sarawak, having been purchased by the British government, he was appointed governor and commander-in-chief, with a salary of £2000 a year. In 1867, B., who had been superseded in the governorship of Labuan, but who still acted as rajah of Sarawak for the sultan of Borneo, was attacked at night in his house by a large body of Chinese, who were irritated at his efforts to prevent opium-smuggling, and only escaped with his life by swimming across the creek. The Chinese committed great havoc on his property, but their triumph was short-lived. B. collected some natives, attacked the Chinese, defeated them in several successive fights, and ultimately forced them into the jungle, where they must have perished of starvation. Upwards of 2000 Chinese were killed, and all their flourishing settlements destroyed. Returning to England soon after this, B. lectured in several of the chief towns on the advantages likely to result to that country from a possession of Sarawak, and urged the desirableness of the British government taking it under its protection, as otherwise it was likely to fall into the hands of the Dutch. To enforce this view, an influential deputation waited upon the earl of Derby in Nov., 1858, without success. B. returned to Borneo in 1861, but visited England again twice before his death, June 11, 1868. See SARAWAK.

**BROOKE**, STOPFORD AUGUSTUS, b. Ireland, 1832; graduated at Trinity coll., 1856; took orders in the Anglican church, and after holding various curacies in London and its vicinity was made chaplain in ordinary to the Queen, 1872. He seceded from the Anglican communion, 1880, affirming his disbelief in the accepted doctrine of miracles. His best known works are *Life of Frederick W. Robertson*, 1865; *Theology in the English Poets*, 1874; *A Primer of English Literature*, 1875; *Sermons*, 6 vols., 1868-88; *History of Early English Literature*, 1892; *The Golden Book of Coleridge*, 1895; *The Old Testament and Modern Life*, 1896, etc.

**BROOK FARM** ASSOCIATION OF EDUCATION AND AGRICULTURE, a socialistic community, founded, 1841, at West Roxbury, Mass., which adopted the views of Fourier in a modified form and attempted to carry them out in action. The organizer and guiding force of the association was George Ripley. He gathered around him many persons who were then, or afterwards became, famous in literature. Chief among these were Hawthorne, Alcott, George W. Curtis, W. H. Channing, and Margaret Fuller. The aim of this assoc., as explained by Ripley, was "more effectually to promote the great purposes of human culture, to establish the external relations of life on a basis of wisdom and purity," and, especially, "to substitute a system of brotherly co-operation for one of selfish competition." It was open to all sects and welcomed all kinds of degrees and mental culture. All members, without distinction of sex, had to labor an allotted period each day for the common good, either on the farm or in the workshops attached to the main institutions. In pursuance of the attempt toward a more just recompense for labor, all employments were paid substantially alike. All shared the same food at the same table, all owned a like portion of the property belonging to the establishment, all had equal access to its educational and literary advantages. The society trafficked with the outside world, selling its surplus produce, and educating children at a low rate of compensation. But it was soon found that enough could not be earned for the needs of the establishment. Moreover many of its brightest ornaments grew weary and left it. The remainder were disheartened. On March 3, 1846, a fire destroyed one of the most important and costly buildings. The association never recovered from this blow. It lingered on for a while and finally dissolved, Oct., 1847. Much of the celebrity attached to this organization is due to Hawthorne's *Blithedale Romance*, in which under the guise of fiction he has evidently utilized many of his experiences at Brook Farm.

**BROOKINGS**, a co. in e. S. Dakota, on the border of Minnesota and Big Sioux river, 795 sq. m.; pop. 1890, 10,132, of whom 145 were Indians. There are several large streams and many lakes in the territory. Co. seat, Brookings.

**BROOKITE**, a mineral of pure native titanite anhydride. It is found in Perthshire, Scotland. A kind found in the Ozark mountains is known as *arkansite*.

**BROOKLINE**, *Veronica Baccabunga*, a species of speedwell (q.v.). It is common in ditches, brooks, and wet places in Europe and in the United States, where it is sometimes called American brooklime. It is a perennial plant, with mostly pedicled, ovate, or oblong leaves, and bluish flowers in axillary racemes.

**BROOKLINE**, a town in Norfolk co., Mass., on the Charles River and the Boston and Albany railroad, 3 miles w. of Boston, with which it is connected by electric railroad. It

is a place of residence for persons doing business in Boston, was incorporated in 1706, and a part of it was annexed to Boston in 1870. There are three villages, banks, high school, a public library, and some notably beautiful churches. Pop. '90, 12,108.

**BROOKLYN**, former city and co. seat of Kings co., N. Y.; after Jan. 1, 1898, constituting the borough of Brooklyn in the Greater New York; situated on the western extremity of Long Island, and is separated from New York by the East river, which connects New York bay with Long Island sound; lat. (at the Navy Yard), 40° 51' 30" n.; long. 73° 59' 30" w.; 147 miles south of Albany; 226 miles northeast of Washington.

**HISTORY.**—Long Island was originally occupied by thirteen tribes of the Algonquin nation; the site of Brooklyn belonging to the Canarsie tribe. From them Jacques Bentyne and Willem Adriaense Bennett bought in 1636 a tract of 930 acres at Gowanus, extending from 37th Street to New Utrecht. In 1637 Joris Jansen de Rapelje, a Walloon, bought 335 acres on Wallabout Bay, called by the settlers the "Waal-bogt." The Indian name for this region was *Meryckawick*, and their name for what is now Brooklyn Heights was *Itpetonga*, the highlands. In 1636 Jan Evertsen Bout settled on the "maize lands of Meryckawick," and with others established Breuckelen, named for a town in Holland, about eighteen miles from Amsterdam. In 1638 the West India Company bought the land east and southeast of Wallabout Bay, where the hamlet of Boswijck sprang up. In 1643 a ferry was established from a point near the present Fulton Ferry to Peck Slip, and a hamlet called "the Ferry" sprang up about it. In 1646 Breuckelen was organized, and the "Five Towns"—Breuckelen, Wallabout, the Ferry, Gowanus and Bedford, inland—were united, and received a patent from Governor Nicolls in 1667. In 1651 Midwout, later Flatbush, was founded, and the first church was built there. In 1666 the first Dutch church was built in Breuckelen. After the province passed into the hands of the English, Long Island and Staten Island were called ridings of York-shire; Kings County, Staten Island and Newtown constituting the West Riding, and this designation was used until 1838. In 1698 the population amounted to 500 persons, including 65 slaves. On August 27th, 1776, the battle of Long Island was fought on the site of Brooklyn, and the village was held by the British till November, 1783. During the Revolution the British prison ships were moored in Wallabout Bay, and many patriots perished; on the "Jersey" alone it is estimated that eleven thousand died of fever or starvation. In 1799 the first newspaper in Brooklyn was started, the *Courier and New York and Long Island Advertiser*. Brooklyn was incorporated as a village in 1816, and received its charter as a city April 8th, 1834. Slavery was abolished in 1825. Williamsburg, which became a city in 1851, and Bushwick (including Greenpoint) were consolidated with Brooklyn in 1855. A new charter was granted in 1873, and amended in 1880 and 1881. In 1886 the town of New Lots was annexed; in May, 1894, the towns of Flatbush and Gravesend were annexed, and New Utrecht, on July 1st, 1894. Flatlands was taken in on January 1st, 1896, when Brooklyn comprised all of Kings co., and was the largest city in extent in the state, with an area of 65.75 sq. m. Under the act of the legislature of 1897 creating the city of Greater New York, all of the city of Brooklyn as then existing was designated as the borough of Brooklyn. For details of the consolidation, see NEW YORK.

**TOPOGRAPHY.**—Brooklyn extends north and south about fifteen miles and east and west about twelve miles. Its elevation above tide-water varies from 7 feet to 194 feet at Mt. Prospect. Its water front on the East River and Bay of New York extends from Newtown Creek to the point beyond Sheepshead Bay. The southern and eastern borders are crossed by a broad range of low hills extending into Queens County. Along the shore opposite the lower point of New York is an irregular bluff, rising to an elevation of 70 to 100 feet, known as Brooklyn Heights. A large part of the southern portion of the city is low. The Eastern District, formerly Williamsburg, includes the thickly settled portions north of Wallabout Bay, and contains a large number of manufactories, and the entire water front is devoted to commerce. Greenpoint, lying between Bushwick and Newtown Creeks, occupies the extreme northwestern part of the city, and contains large shipyards and manufactories.

**BUILDINGS.**—Fulton Street, the principal business street of Brooklyn, begins at Fulton Ferry and runs first south and then east a distance of six miles. A short distance from the ferry are the entrance to the Brooklyn Bridge (See BRIDGE), the new terminals for the elevated roads, and the plaza formed from the land acquired by the city for the purpose. The next object of interest is the City Hall, a white marble Ionic building, with a portico of six columns, approached by a long flight of steps. East of the City Hall is the Kings County Court House, a handsome marble structure in Corinthian style; and adjoining are the Municipal Buildings and the Hall of Records, a handsome edifice of white oolitic limestone, in Renaissance style, containing immense vaults for storing public documents. On the small triangular green in front of the City Hall stands a fine bronze statue of Henry Ward Beecher, by J. Q. A. Ward. At the corner of Washington and Johnson Streets, a little north of City Hall Square, is the new Post Office, a fine granite building 165 feet square, erected at a cost of \$1,886,115. It is built in Romanesque style, with numerous turrets and a tall tower, but is disadvantageously situated on a narrow street. It was opened in 1892, and is occupied by the Post Office and the Federal Courts. On the opposite corner is the new and attractive building of the Brooklyn *Engle*, a leading newspaper of the city. Most of the financial institutions of Brooklyn centre about City Hall Square, from which Montague Street runs to the river, a distance of about four blocks, and ends in a terrace which commands a fine view of New York and the harbor. The most noteworthy buildings on this street are the Academy of Music, the Art Assoc-

ciation Building, and the Brooklyn Library. The Academy is the largest place of amusement in the city, with a seating capacity of 2800. Adjoining it is the Art Association Building, of pure Gothic form, in brown stone ornamented with colored marble. In its galleries are held the exhibitions of the Art Association and of the Brooklyn Art Club. Opposite is the fine Venetian Gothic building of the Brooklyn Library, which contains a circulating library of more than 100,000 volumes, a large and valuable reference library and reading rooms. On the next corner is the beautiful Gothic church of the Holy Trinity, the leading Episcopal church in the city. It has a spire 275 feet high, remarkable for its tracery and finials. On Remsen Street is the Congregational Church of the Pilgrims, of which Dr. Storrs is pastor, and which contains a piece of the original Plymouth Rock in its walls. On the corner of Clinton Street is the handsome house of the Hamilton Club, in front of which stands the excellent bronze statue of Alexander Hamilton, designed by W. C. Partridge. On the corner of Pierrepont and Clinton Streets is the building of the Long Island Historical Society, a handsome structure of red brick with terra-cotta ornaments. It contains a lecture hall, a reference library of about 60,000 volumes, and a museum of Long Island relics. Diagonally opposite is the elaborate and costly building of the Brooklyn Bank, of white granite in classic style with red tiled roof. This region is known as the Heights, and is one of the most attractive districts of the city, and contains the principal hotels, large apartment-houses, and several of the leading clubs. Columbia Heights, a street running parallel with the river, is on the highest part of the bluff. Opposite each cross street pretty little parks have been laid out, and afford glimpses of the river and New York. At the north end of the Heights, on Orange Street, stands the famous Plymouth Church, where Henry Ward Beecher preached for forty years. It is a plain brick building, seating about 2800 persons, and contains one of the largest church organs in America. Near the City Hall, on Joralemon Street, is the well-known Packer Institute for girls. In the next street is the Polytechnic Institute for boys, for which a fine new Romanesque addition has been constructed. On Schermerhorn Street is the Germania Club-house, a Romanesque building with an elaborate and graceful façade. The handsome Romanesque Thomas Jefferson Club-house stands opposite the Hall of Records. From the City Hall to the junction of Flatbush Avenue Fulton Street is the chief retail shopping district. In this region, between Smith and Hoyt Streets, stood the first Dutch church, and here was the nucleus of the village of Brooklyn. On the corner of Bond Street is the building of the Young Men's Christian Association, one of the finest in the country. It contains a hall capable of seating 1400 persons, and a remarkably fine gymnasium. On Flatbush Avenue, a short distance above its junction with Fulton, is the Long Island Railroad Station. Near it is the attractive Young Women's Christian Association Building of buff brick, finished in 1892. A few blocks farther east is the fashionable district known as the Hill. The most beautiful streets are Clinton and Washington Avenues, which are wide and well shaded, and contain many beautiful residences. Between De Kalb and Myrtle Avenues is Washington Park, on the site of the Revolutionary earthworks known as Fort Putnam, and later as Fort Greene. It contains about 30 acres, and lies on a high ridge, on the crest of which is the site of the old redoubt. From this point the ground slopes in three beautiful grassy terraces, broken by flights of stone steps. On the second terrace is the vault containing the remains of the American soldiers who perished on the prison-ship Jersey. Some distance to the northeast is the Navy Yard, the principal naval station in the United States. It lies on Wallabout Bay, and covers about 144 acres, the yard proper including 45 acres, and has more than a mile of wharfage. Among the most interesting features are the great granite dry-docks; one 307 feet long by 98 feet wide, and costing \$2,000,000; while the newer dock is 465 feet long and 210 feet wide. On Ryerson Street, situated near De Kalb Avenue, is Pratt Institute, one of the best-equipped technical institutions in the world, founded by the late Charles Pratt in 1884, and endowed by him with funds amounting to more than \$3,690,000. The buildings are the Main Building, the High School, the Science and Technology Building and the Trade School; and include classes for instruction in all trades and useful arts. There are about 125 teachers and nearly 4000 students. The free public library of the Institute contains over 60,000 volumes. Brooklyn's chief attraction is Prospect Park, in the southwestern part of the city. It is situated on a high ridge, and commands fine views of New York, the harbor, Long Island and the ocean. It has an area of 500 acres, and though not as elaborately laid out as Central Park, has many natural beauties, in its fine old trees, wooded hills, and broad meadows. The principal features of the park are the lake, containing 61 acres, and Lookout Hill, which is 185 feet above the sea, and gives a magnificent view. Near the entrance is a fine statue of J. S. T. Stranahan, by MacMonnies. At the southern entrance is an imposing gateway, near which begins the Ocean Parkway, a magnificent drive leading to Coney Island  $\frac{5}{8}$  miles distant. It is 210 feet wide and has three separate roadways bordered by trees. Much of the fighting in the battle of Long Island took place within the limits of the Park, and is commemorated by a tablet in Battle Pass. The principal entrance is at Flatbush Avenue, and the circular Plaza in front of it is adorned by a large fountain, a bronze statue of Lincoln, and the imposing Memorial Arch, erected in honor of the soldiers and sailors of the Civil War. The Eastern Parkway, a boulevard 200 feet wide, runs from the Plaza in an easterly direction. On it, near the Plaza, is being erected the new Museum of Arts and Sciences of the Brooklyn

Institute. The building, which will be in classic style, will be 480 feet square, built around four interior courts, and will cost about \$3,000,000.

**EDUCATION.**—There were, in 1896, 115 public schools, 2859 teachers, and 127,571 registered pupils, with an appropriation of \$2,986,261, of which \$2,000,000 was for teachers' salaries. The public school system includes a training-school for teachers, a Girls' and a Boys' High School, a Manual Training High School, and a truant school. Brooklyn is celebrated for its excellent private schools. Four are of the first rank—Packer Institute for girls, with 768 students; the Polytechnic Institute for boys, with 781 students; the Adelphi College for boys and girls, with 965 students; and Pratt Institute, with nearly 4000 students. There are two Roman Catholic colleges, three business colleges, the Medical School of the Long Island College Hospital, with which is connected the Hoagland Laboratory, with apparatus probably unsurpassed in the United States, the Brooklyn College of Pharmacy, and 14 free kindergartens. The principal educational organization is the Brooklyn Institute, developed from an association founded in 1828, and chartered 1843; enlarged and re-chartered 1887-1890. Its aim is the advancement of art, science and education of the people by means of lectures, classes and collections. It includes twenty-five departments, each of which holds meetings and lectures, and has a membership of 2000. The Brooklyn Art School is now affiliated with the Brooklyn Institute. Good art schools are also connected with the Adelphi Academy and with Pratt Institute.

**LIBRARIES, PRESS.**—The largest library is the Brooklyn, a subscription library containing 120,000 volumes. The library of the Long Island Historical Society contains 54,000 volumes. The principal free libraries are those of Pratt Institute, 60,000 volumes, the Brooklyn Institute, 15,600 volumes, the Union for Christian Work, 31,768 volumes, the Spicer Memorial, 7,500 volumes, the Y. M. C. A., 14,000 volumes, and the Y. W. C. A., 7,000 volumes. There are 5 daily and a large number of weekly and monthly periodicals.

**CHURCHES AND INSTITUTIONS.**—Brooklyn was long known as the City of Churches, but that title is no longer appropriate. There are now 307 Protestant and 61 Roman Catholic churches. There are 20 hospitals; the most important being Brooklyn, Long Island College, Brooklyn Homeopathic, Methodist, General, St. Mary's, St. Peter's and St. John's. Brooklyn has 5 training schools for nurses, 24 dispensaries, 11 homes for the aged, 25 orphan asylums and industrial schools, 6 nurseries, and homes for incurables and consumptives. The public institutions at Flatbush consist of the Almshouse, Hospital, and Insane Asylum. The Inebriates' Home is at Bay Ridge.

**THEATRES AND CLUBS.**—The leading Brooklyn clubs are the Hamilton, Montauk, Oxford, Union League, Lincoln, Jefferson, Brooklyn, Germania, Crescent Athletic—all owning handsome houses—the Riding and Driving Club, and the Midwood Club of Flatbush. The oldest theatre is the Park; the Columbia is the finest, and has a seating capacity of 2000. Among the other theatres are the Star, the Bijou, and Amphion.

**PARKS AND CEMETERIES.**—Besides Prospect and Washington Parks, there are 19 parks in the city, and 9 others are being laid out. Within or near Brooklyn there are thirty cemeteries, with an aggregate area of 8100 acres. The largest are Greenwood, Evergreens, Cypress Hills, Calvary and Holy Cross. Greenwood, the most beautiful burial-place in the country, is situated on a high ridge in the southern part of Brooklyn, overlooking the bay, and contains about 474 acres. At the principal entrance is an elaborate gateway, ornamented with bas-reliefs. Greenwood was opened in 1842, and since then more than 270,000 interments have been made.

**MILITIA.**—The National Guard of Brooklyn comprises the Thirteenth, Fourteenth, Twenty-third and Forty-seventh Regiments, the Third Battery of Artillery, a Signal Corps, the Seventeenth Separate Company, and Troop C, about 8100 men in all. The Twenty-third is the leading regiment, and has a fine armory.

**FINANCE AND TRADE.**—In 1896 Brooklyn contained five national banks, with capital of \$1,352,000; nineteen State banks, with capital of \$3,000,000; fifteen savings banks, with \$115,564,925 deposits; eight trust companies, 38 co-operative savings and building loan associations, and five fire insurance companies. Brooklyn is one of the largest grain and warehouse depots in the United States. Four-fifths of the grain received by the Trunk Lines and the Erie Canal are stored in the grain elevators of Brooklyn, the capacity of which exceeds 2,000,000 bushels, and the transfer capacity is 125,000 bushels per hour. The warehouses have a capacity of 90,000,000 cubic feet, and the value of articles in storage ranges from \$200,000,000 to \$450,000,000 yearly. The number of manufactories in 1890 was 10,568, with \$161,730,500 capital, employing 109,292 persons, and the value of the products was \$269,244,147. The leading industries are sugar, coffee, chemicals, meat-packing and cordage. Nearly 50 per cent. of the sugar consumed in the United States is refined in Brooklyn. The largest sugar refinery, the largest oil refinery and the largest cooperage works in the world are in Brooklyn. Brooklyn has more than twenty-six miles of wharfage, and is famous for her docks. The Atlantic Basin lies opposite Governor's Island, and encloses an area of 40 acres, with a wharfage of 3 miles, bordered by warehouses and elevators; 500 large vessels can be accommodated at one time. The Erie Basin encloses 60 acres and the Brooklyn Basin 40 acres. South of these are the largest dry-docks in the United States. The largest is 600 feet long and 124 feet wide, and can hold the largest vessel afloat. There are 33 lines of steamers that sail from Brooklyn, besides a large number of tramp steamers. The Brooklyn terminus of the Long Island Railroad is at the Flatbush Avenue Station. In addition there are many local railroads to the adjacent resorts.

**GOVERNMENT.**—The city government (1897) consisted of a mayor and board of 28

aldermen, called the Common Council. There were 15 departments, and the mayor appointed all officials except the Comptroller and the Auditor. See NEW YORK: THE GREATER NEW YORK. In 1896 the tax levy was \$15,999,579; the net city debt, \$56,948,097; assessed valuations, \$582,847,038; tax rate, \$2.90 per \$100. The receipts of the city treasury, with balance from 1895, aggregated \$30,767,016; expenditures, \$27,498,483. The police force numbers 1,745 men, and includes 29 precincts, 8 mounted squads, and has 19 patrol wagons and a patrol boat. The fire department numbers about 850 men, and has 54 engines, a water tower, 2 fire boats, 64 hose wagons and tenders, 15 hook and ladder trucks, and 129 chemical extinguishers. The water supply is drawn from streams and lakes draining an area of 75 square miles, about 20 miles distant. The water is conveyed through a stone aqueduct underground to the city. The present daily supply is 80,000,000 gallons, and will be increased to 105,000,000 gallons. There are five lines of elevated roads, and more than forty lines of electric surface cars, and one cable line. There are fourteen ferries to New York, and the Annex boats connect with Jersey City and Hoboken.

The population in 1790 was 1603; 1800, 2378; 1820, 7175; 1840, 36,233; 1850, 96,850; 1860 (after consolidation), 266,661; 1870, 396,009; 1880, 566,663; 1890, 806,348.

**BROOKS**, a co. in s. Georgia, bordering Florida; 529 sq. m.; pop. '90, 13,979. Co. seat, Quitman.

**BROOKS**, CHARLES WILLIAM SHIRLEY, b. Oxfordshire, England, in 1816; was admitted to the bar, but adopted literature as a profession, settling in London. He contributed to leading periodicals and journals, among them *Punch*; wrote several dramas, and the novels *The Gordian Knot*, *The Silver Cord*, etc. He acquired a reputation as a lecturer. On the death of Mr. Mark Lemon, in 1870, B. became the editor of *Punch*. He died in 1874. A volume of his *Wit and Humor* appeared in 1875.

**BROOKS**, JAMES, 1810-73; b. Maine; a journalist and politician. He graduated at Waterville college, and was principal of a Latin school in Portland; became a writer of letters to various newspapers, and originated the idea of regular correspondence from Washington. As a member of the Maine legislature in 1835, he proposed a survey for a railroad from Portland to Quebec or Montreal. In that year he made tour of Europe on foot, sending his observations to the *Portland Advertiser*. In 1838, he established the *New York Express*, published both morning and evening, which still survives as a prominent evening newspaper. In 1847, he was a member of the state legislature, and in 1848 was elected to congress. During the native-American excitement, 1841-44, his paper was strongly in favor of that party. In 1850, he favored the compromise measures of Henry Clay, and after the outbreak of the civil war he left the party with which he had been so long identified, and was immediately returned to congress by the democrats. In 1871, after a rapid trip abroad, he published *A Seven Months' Run Up and Down and Around the World*.

**BROOKS**, JOHN, M.D., 1752-1825; an American patriot who, on hearing of the affair at Lexington, marched to the place from Reading with a company of minute-men just in time to see the British in retreat. He served in the war, and was frequently promoted. After the peace, he resumed the practice of medicine at Medford, and in 1816 was elected governor of Massachusetts, and re-elected annually until 1823.

**BROOKS**, MARIA GOWEN, 1795-1845; b. Mass.; an American poetess, by Robert Southey called "Maria del Occidente." She lost her father when young, and was protected and educated by her future husband, a Mr. Brooks, a merchant of Boston. After his death, she went to Cuba, and in 1830 visited London and Paris. Some of her works are *Judith*, *Esther*, and other Poems; *Zophiel*, or the Bride of Seven; *Idomen*, or the Vale of Yumuri; and *Ode to the Departed*.

**BROOKS**, PHILLIPS, D.D., b. Mass., 1835; graduate of Harvard, and in 1859-1870 rector of Episcopal churches in Philadelphia; in the latter year becoming rector of Trinity Church, Boston. He was celebrated as a pulpit orator, and as a vigorous and independent thinker. His freedom from the ordinary sectarian trammels, his liberal views of doctrine, with his profound convictions as to vital Christian truths, and his deeply spiritual yet intensely practical preaching, gave him great popular power. In 1891, he was elected bishop of Massachusetts. He died Jan. 23, 1893.

**BROOKS**, PRESTON SMITH, 1819-57; graduate of South Carolina college; was in the state legislature, and served in the war with Mexico. In 1853 he was a member of congress, and was re-chosen in 1854. May 22, 1856, he assaulted Senator Sumner, striking him over the head with a cane while in his chair in the senate chamber, and severely injuring him. The house of representatives did not expel him, though a committee reported in favor of doing so; but he resigned, only to be immediately re-elected by his constituents. He died suddenly before the close of the second month of his term.

**BROOM**, a name given to a number of species of shrubs of the closely allied genera *cytiscus*, *genista*, and *spartium*, of the natural order *leguminosae*, sub order *papilionaceae*—all of them having long slender branches, along which are produced axillary flowers. The genera differ in the form of the standard (see *PAPILIONACEAE*), which is roundish in *spartium*, broadly ovate in *cytiscus*, and oblongo-ovate in *genista*, whilst *spartium* has also an acuminate keel, and that of *cytiscus* is very obtuse, that of *genista* being oblong and not wholly including the stamens and pistil. The legume is many-seeded in all the

calyx 2-lipped, and the filaments united in a tube.—Common B., *Cytisus scoparius*, the trivial name being from the Lat. *scopa*, long twigs, or a besom—which has by different botanists being ranked in each of the genera just named, although it possesses the characters above assigned to *Cytisus*, but has recently been made the type of a new genus, under the name of *sarothamnus scoparius* or *communis*—is a well-known native of Britain and of the continent of Europe, growing in dry soils, and ornamenting hedgebanks, hills, and bushy places, in May and June, with its large yellow flowers, which are on short stalks, drooping, solitary, but produced in considerable number along the straight slender branchlets. The whole aspect of the plant is graceful. The lower leaves have three oblong leaflets, the upper ones, or bracts, are simple; the branches are angular and of a very dark green, very tough, and much in use for making besoms. They have also been used for tanning and dyeing; and their fiber has been woven into a coarse strong cloth, and even made into paper. The whole plant is very bitter, with a peculiar nauseous taste and smell when bruised. The young tops and seeds are used in medicine, being powerfully diuretic, and very beneficial in some kinds of dropsy. They are also mildly laxative, and in large doses emetic. They are commonly administered in the form of a decoction. B. inhabits colder climates than furze, reaching to a greater elevation on mountains, and being found beyond the northern limit of furze. It varies in size from a very humble shrub to one of 20 or even 30 ft. in height, and when it reaches this size, the wood is of great value for the finer purposes of cabinet-makers and turners.—Irish B., *Cytisus* or *sarothamnus palens*, not unfrequent as an ornamental plant in British shrubberies, is not at all a native of Ireland, but of Spain and Portugal.—Portugal B., or White B., *Cytisus albus*, a native of the countries bordering on the Mediterranean, is very often planted in Britain as an ornamental shrub, and is much admired for the beauty of its fasciated white flowers, which are produced upon long filiform branches. Its leaves have three leaflets. It sometimes attains a height of 15 or 20 feet.—Spanish B., *spartium junceum*, is a native of the s. of Europe, generally growing in dry soils and rocky situations, and attaining a height of 8 ft. or upwards. Its branches are upright, round, and rush-like, a characteristic of this genus. They are smooth, and bear only a few small simple leaves, which soon drop off. The fiber of the branchlets is much used in some parts of Italy, France, and Spain, for making cloth, ropes, etc. In the s. of France, the plant is cultivated on dry unproductive soils. The branchlets are made into bundles, dried, beaten, steeped, and washed, in order to the separation of the fiber. It possesses medical properties similar to those of the common B.—A white-flowered species, *S. monospermum*, occasionally to be seen in British shrubberies, grows abundantly on the loose sands of the coasts of Spain, and produces a similar fiber. It is mentioned by Barth as growing in great abundance in Africa to the s. of the great desert. Many species somewhat resembling these are occasionally to be seen in Britain among ornamental plants, some of them often in greenhouses. The Canary isles produce some remarkable for the fragrance of their flowers. The name B. is not given to those species of *Cytisus* (q.v.) and *genista* (q.v.) which do not display in a marked degree the character of having long slender twigs.—Butcher's B. (q.v.) is a plant of an entirely different family.

**BROOM-CORN**, a grass cultivated in North America for the manufacture of brooms and whisk brushes, which are made of the tops of the culms and the branches of the panicle. It is regarded as a mere variety of the same species (*Sorghum saccharatum*) of which the shaloo, or sugar-grass (see SUGAR-CANE and DURRA), is another variety. It has been much longer cultivated in America than the sugar-yielding variety, and is said to have been brought from the East Indies. B.-C. often attains a height of 12-15 ft. The stalks are long and hard, and are often plowed under to serve as manure, although cattle will feed on them before they are touched by frost. Cattle are fond of the leaves as well. The seed has about the same value as oats for feeding. The usual practice in harvesting is to bend the stalks 2½-3 ft. from the ground, cut off the tops 6-8 in. below the panicle and lay them in heaps, to be conveyed to the scraper, which is wrought by horse-power and which removes the seed. For marketing, B.-C. is pressed in bales averaging about 300 lbs. each. Five hundred lbs. to the acre is a fair average yield, and the producers generally realize \$40-\$50 per ton. It is usually dried under cover to preserve its color, which, to bring the best prices, must be as green as possible. Formerly the Mohawk and Conn. river valleys furnished most of the supply in the U. S. Illinois now leads, with an annual production of about 14,000 tons, raised chiefly in the central part of the state. Kansas produces from 6000-10,000 tons; Nebraska, from 4000-6000 tons; Missouri, 1000-2000, and Ohio, about 1000. Some attention is paid to its growth in Tennessee, Iowa, Kentucky, and California. The estimated crop throughout the U. S. for 1899 was about 25,000 tons. Spain and Italy raise an inferior quality, but out of the U. S. the production is small. In the manufacture of brooms and whisks the most improved machinery is employed. The exports to Gt. Britain, the Continent, Australia, and the West Indies are large. Also there is a considerable export of the corn in bales to Australia and the West Indies.

**BROOME**, a co. in s. New York, on the Pennsylvania border; 685 sq.m.; pop. 1875, 42,149; in 1890, 62,973. It is drained by the Susquehanna, Chenango, Otselic, and other streams, and intersected by the New York and Erie, Albany and Susquehanna, Syracuse



and Binghamton, and Delaware, Lackawanna and Western railroads, and the Chenango canal. Productions agricultural, including an immense quantity of butter. Co. seat, Binghamton.

**BROOME, WILLIAM, LL.D., 1689-1745;** coadjutor of Pope in translating the *Odyssey*. For writing all the notes and translating eight books of the Greek text, B. received \$2500, a price which he considered too small. Comments on this transaction annoyed the poet so that he abused B. in the *Dunciad* and in the *Bathos*. B. published a *Miscellany of Poems*, and translated some of Anacreon's odes.

**BROOMRAPE.** See OROBANCHÆ.

**BROOMS.** See BRUSHES AND BROOMS.

**BROSE,** a dish sometimes used in Scotland, made by pouring boiling water, milk, or the liquor in which meat has been boiled, on oatmeal, and mixing the ingredients by stirring till small lumps have been formed. Butter may be added, and sweet milk when the brose is made with water. It is called *kail-brose*, *water-brose*, or *beef-brose*, according to the liquid used. *Athole-brose*, a famous Highland cordial, is a compound of honey and whiskey.

**BROSSES, CHARLES DE,** a learned French historian, was b. at Dijon, Feb. 17, 1709. His first work was *Lettres sur l'Etat de la Ville d'Heroulanoum*, the result of a tour through Italy in 1739. At the suggestion of his friend Buffon the naturalist, he wrote the *Histoire des Navigations aux Terres Australes* (1756), in which he described the supposed great southern continent under the several names of Magellania, Australia, and Polynesia. The last two of these names, now commonly used, were first employed by B. His next work was *Du Culte des Dieux Fétiches*, etc. (1760). It was followed by a *Traité de la Formation Mécanique des Langues* (1765), which, in spite of many errors, contains not a few novel and ingenious observations and conjectures. During the greater part of his life, B. was occupied in endeavoring to supply the *lacunes* in the works of Sallust; and having collected about 700 fragments by this historian, he published, with such interpolations as he deemed necessary, the *Histoire de la République Romaine dans le Cours du Septième Siècle, par Salluste* (1777). B. died as president of the parliament of Burgundy May 7, 1777. His letters from Italy, under the title *Italie il y a Cent Ans*, were edited and republished by his son René, count de Broesses, in 1834.

**BROTH** is an infusion or decoction of vegetable and animal substances in water. It is customary to use more or less meat, generally ox-flesh, with bone, and certain vegetables, as cabbage, greens, turnips, carrots, pease, beans, onions, etc. The whole are mixed together in cold water, heat slowly applied, and the materials allowed to simmer for some hours. The meat yields up certain ingredients, whilst others are retained in the residual flesh. The following table will illustrate this:

Ox-flesh heated with water

Yields to the Water.

Albuminous matter.  
Gelatine.  
Kreatine.  
Extractive matters or osmazome.  
Lactic acid.  
Salts.  
Fat.  
Saccharine matter.

Leaves in the Boiled Meat.

Fibrin.  
Coagulated albumen.  
Gelatinous tissue.  
Fat.  
Nervous matter.

The vegetables yield albuminous constituents, coloring and mucilaginous matter, and volatile oils and salts.

The real nutritive material present in B. is less than is generally thought, though it aids in satisfying the cravings of the appetite. To invalids, however, the form of B. known as beef-tea (q.v.) is of great importance, as it affords the weak and sickly stomach a light palatable article of diet at a time when stronger food would do the weakened system much harm. See NUTRITION.

**BROTHERHOODS, RELIGIOUS.** These were societies instituted for pious and benevolent purposes, and were numerous in the middle ages. Their origin is probably to be traced to the desire which then prevailed to imitate the spiritual orders. They were usually founded at first without ecclesiastical authorization, on account of which, several of the confraternities that either did not seek or did not obtain the recognition of the church, assumed the character of sects, and were suspected of heresy. To this class, among others, belonged the Beghards and Beguines (q.v.), the Brothers and Sisters of the Free Spirit (see below), the Apostolic Brethren (q.v.), the Flagellants (q.v.), who, tolerated by the church for a while, at last incurred its displeasure, and were severely persecuted. We may also reckon among religious B. the old building corporations, from which sprang the order of Freemasons, the religious character of whose secret societies indicated, in the opinion of the church, a peculiarly dangerous gnos̄is and symbolism. Others coming into existence under ecclesiastical oversight, or at least being confirmed by the church, had no *arcano*, but were simply dedicated to the promotion of religion, either by the imposition of new penances, the acceptance of new and severer devotions, or the assisting of strangers, travelers, the unprotected, the oppressed, the destitute, and

the sick. Nor can we refuse our admiration and approbation to such self-denying fraternities, when we remember how defective were the early communities in charitable institutions. They were most numerous in Italy, Rome alone boasting more than a hundred.

**BROTHERS AND SISTERS OF THE FREE SPIRIT**, a sect which sprang up in the Rhine country during the 13th c., and afterwards spread into France and Italy. It grounded its peculiarities on the biblical doctrine that the Holy Spirit is a spirit of "freedom." Misunderstanding the true nature of spiritual freedom, the members of this sect conceived themselves released not only from the thralldom of the church, but also from the obligations of morality. They set aside the marriage-tie, and indulged in licentiousness. A few even maintained that the deeds of the body could not possibly affect the soul. Intellectually, they are said to have been given to Pantheism. The synods of Cologne in 1806, and of Treves in 1810, decreed their suppression, and in the persecutions which ensued, they appear to have been completely dispersed.

**THE BRETHERN OF SOCIAL LIFE, BRETHERN OF THE COMMON LOT, OR BRETHERN OF GOOD WILL** (also called **HIERONYMITES** and **GREGORIANS**, from Hieronymus and Gregory the great, whom they claimed as patrons), a fraternity founded about 1876 by Geert Groote (b. at Deventer, 1340, d. 1384) and Florentius Radewin (b. 1350, at Leerdam, in s. Holland, d. 1400). This society—which professed to be a copy of the earliest Christian communities, and was in several respects a forerunner of the subsequently formed societies of United Brethren, now sometimes styled Moravians—was composed of persons who sought after pious and spiritual exercises without any conventional distinctions of order, etc. Community of goods, ascetic habits, industry, care of the education of young persons, and the use of the vernacular language in divine service, were some of the chief points insisted on by the brethren, who were not fettered by monastic or any other vows. Perfect community of goods was a rule of their societies. Despite the persecutions which they suffered from the mendicant friars, they were recognized and sanctioned by several popes and by the council of Constance. They became most numerous in the Netherlands and n. Germany, but also spread themselves in Italy, Sicily, and Portugal, so that, in 1430, they reckoned more than 180 societies. The last was founded at Cambray in 1505. Several brotherhoods of Gregorians assisted in the reformation. In other cases, their institutions fell into the hands of the Jesuits. Though the original founders of these societies were opposed to all learning and science which was not purely moral and practical, their followers rendered most important services to popular education, having free schools in connection with many of their houses, supporting students at other schools, and distributing useful books. They have, indeed, been not incorrectly described as pioneers of the reformation. After the revival of learning in Italy, the Brethren of Social Life entered into the spiritual activity of the time. The most important and distinguished members of the society were Gerhard Zerbold of Zutphen, Thomas à Kempis, and the learned cardinal Nicholas Cusa.—Female societies, of a similar character, sprung up at the same time with those of the Brethren of Social Life. At the head of each was a superior or directress, who was styled the *Martha*.

**BROTHER \* JONATHAN**, a synonym for the people of the United States, as "John Bull" is for the people of England. When Washington took command of the revolutionary forces in New England, he found an immediate necessity for arms and other war materials. Jonathan Trumbull was then governor of Connecticut, a man of excellent judgment, and a highly esteemed friend of Washington. It happened that at an important council of officers where the wants of the service were the topic under consideration, Washington remarked, in reference to some knotty question: "We must consult Brother Jonathan," meaning Governor Trumbull. The expression was repeated on occasions of difficulty, and before the war closed it was established as a convenient name for the whole people. See **TRUMBULL, JONATHAN**.

**BROTHERS**, a name given to a group of six or eight rocky islets immediately outside the strait of Bab-el-Mandeb, varying in height from 250 to 350 feet. They lie off the African coast about 9 m. s. of the island Perim, now occupied by England. Of the loftiest point, the lat. and long. respectively are 12° 28' n., and 43° 22' e.—Brothers is also the name given to three isolated mountains near the coast of New South Wales, between Harrington inlet to the s., and Port Macquarie to the n., or between lat. 33° and 31½° south. They are valuable as landmarks.

**BROTHERS, LAW OF DESCENT AMONG**. In the law of England, this was immediate, without reference to the parent as the *commune vinculum*; but by the 3 and 4 Will. IV. c. 106, s. 5, it is enacted that no brother or sister shall be considered to inherit immediately from his or her brother or sister, but every such descent shall be traced through the parent. See **INHERITANCE**.

**BROTHERS, LAY**, an inferior class of monks, not in holy orders, but bound by monastic rules, and employed as servants in monasteries (q.v.).

**BROTHERS, RICHARD**, b. Newfoundland 1757; a fanatic, whose prophecies and writings excited a sensation, was at one time a lieut. in the British navy, which he quitted in 1780. Refusing, from conscientious scruples, to take the requisite oath to enable him to receive his half-pay, he was reduced to great distress, and ultimately placed in the

workhouse. Dating his first call from 1790, he announced himself, in 1798, the apostle of a new religion, "the nephew of the Almighty, and prince of the Hebrews, appointed to lead them to the land of Canaan." In 1794, he published a book, in two parts, entitled *A Revealed Knowledge of the Prophecies and Times*, etc.; and, in 1795, an *Exposition of the Trinity*. He was the author of several other publications, marked by a strange mixture of reason and insanity. In consequence of prophesying the death of the king, and the destruction of the monarchy, he was committed to Newgate, but soon liberated. Some of his political predictions, especially in reference to the state of the continent, were either altogether or partially fulfilled; and many persons were induced to sell their goods, and prepare to accompany him to his New Jerusalem, which was to be built on both sides of the river Jordan, where he was to arrive in the year 1795. His disciples were not confined to the poor and ignorant, but even men of ability and education were deluded into believing in him, two of the most eminent being Nathaniel Brassey Halhed, esq., M.P., the orientalist, and Sharp, the celebrated engraver. As a dangerous lunatic, he was at length, by order of government, committed to Bedlam, but released April 14, 1806, and died Jan. 25, 1824.

**BROTHERS AND SISTERS OF CHARITY.** Under these names, there exist in the Roman Catholic church two widely ramified beneficent societies, for the nursing of the poor and sick in hospitals, without distinction of faith, rank, or nation. The order of the brothers of charity, or Compassionate Brothers, was established in 1540, at Seville, in Spain, by the Portuguese John di Dio (died 1550), who had served in Africa under Charles V. The funds for the purpose were obtained by begging. The primitive object of the society was the care of the sick, and the reformation of women of immoral character: it was composed of lay-members, under no rule. In the year 1572, the order received the papal recognition, and was subjected to the rule of St. Augustine. All the privileges of the mendicant orders were conceded to it in the year 1624, and it was then divided into a Spanish congregation, with a maj.gen. in Granada, and an Italian or extra-Spanish congregation, with a maj.gen. in Rome. To the latter belong also the brothers of charity in Switzerland, Germany (where Austria is their chief seat), Poland, the Netherlands, France, and other countries. The European members of the order clothe themselves in black; the extra-European, who are under a separate gen. of their order in America, wear brown. Their services to distressed humanity continue to be held in high estimation. The sisters of charity, formerly also, on account of their dress, called *gray sisters*—independent associations of unmarried Christian females, for the alleviation of human suffering, especially for the tending of the sick and the poor—were first called into existence in France, in 1634, by Vincent de Paul (born 1576), greatly assisted by the noble-hearted and self-devoted widow, Le Gras, by birth De Marillac. The society was recognized in 1655 by Clement IX., and in 1685 already numbered 224 convents. The French revolution sorely interrupted the abundant and benevolent labors of the sisters of charity by the suppression and proscription of their convents in France; but Napoleon restored the order in 1807 by the convocation of a general chapter of the scattered sisters, under the presidency of the empress mother, and by the grant of the necessary funds; and there exist at present more than 800 associations in France, where, in the villages, elementary education is in great part conducted by them. They attend the sick in all the great hospitals. There exists in Germany a Roman Catholic association of unmarried females, not bound by conventual rules, and possessing the right of withdrawing from the association at pleasure, but placed under a strict supervision, and occupied in the same duties as the sisters of charity. The institute of deaconesses (q.v.) in the Protestant churches of the continent of Europe is of a very similar character. See **SISTERHOODS**.

**BROUGHAM, HENRY**, Lord BROUGHAM AND VAUX, was b. in Edinburgh, 19th Sept., 1778. His father, Mr. Henry Brougham, was the descendant of an ancient family in Westmoreland, and his mother, Eleonora Syme, who was a woman of much talent, was a niece of Robertson the historian. B. received his education at the high school, and afterwards at the university, of Edinburgh. He gave early promise of future ability, some mathematical papers written by him at the age of eighteen having been considered worthy of publication in the transactions of the royal society. He spent some time in traveling on the continent, and in 1800 was admitted to the Scotch bar. In company with Jeffrey, Horner, and Sydney Smith, B.'s first public efforts were given to the service of the *Edinburgh Review*, and he contributed to it some of its most powerful articles. His liberal political views excluded him from the hope of promotion in Scotland, and a character which he had acquired for eccentricity and indiscretion, excluded him from all legal practice, except the unremunerative practice of the criminal courts. After seven years of vain attendance in the courts at Edinburgh, he betook himself to a field more worthy of his ambition, and in 1808 passed at the English bar.

In London, B. first attracted public notice by the admirable appearance he made at the bar of the house of commons, when he was employed on behalf of certain Liverpool merchants to ask the repeal of the orders in council. Soon after this, in 1810, he entered parliament, and within a few months of the time of taking his seat, brought in and carried his first public measure—an act making participation in the slave-trade felony. He was welcomed by the opposition leaders, to whose party he had attached himself, as a

most powerful assistant in their attacks upon the government. B. succeeded in carrying the repeal of the obnoxious orders in council shortly before the general election of 1812, and then ventured to contest, along with another whig, the membership for Liverpool against Canning and another tory. He was defeated, and remained without a seat in parliament till 1816, when he was returned for Winchelsea, and again became an active member of the opposition. By this time he had also established some reputation in the courts of law. He never, indeed, acquired a very large practice, but he repeatedly distinguished himself by speeches of great vigor and ability in the defense of persons prosecuted for libel by the crown. His most famous appearance as an advocate, however, was in defense of queen Caroline, when, along with Denman, he defended the injured queen with unequalled courage and disinterestedness, at the cost, as both well knew, of exclusion, for years to come, from all professional advancement. But his eloquence and boldness, though they forfeited for him the favor of the crown, gained him that of the people, and for the ten years between 1820 and 1830, B. was the popular idol. He made no bad use of his power. In 1822, he used it, though in vain, in support of a scheme of national education; and to his activity is owing, in great measure, the establishment of the London university, of the first mechanics' institute, and of the society for the diffusion of useful knowledge. In 1830, B. delivered a most powerful speech against slavery, and in consequence of it—as he himself believed—was invited to stand, and returned, as member for the great popular constituency of the co. of York. The aristocratically disposed whigs would—had they dared—have excluded B. from the reform ministry; but, in addition to having enormous popularity, he was virtually their leader in debate in the commons, and was thus, in spite of his unmanageableness, indispensable. After various intrigues, B. was offered, and was persuaded, against both his interests and his inclinations, to accept a peerage and the chancellorship. He took his seat in the lords in Nov., 1830, and assisted very materially in carrying through that house the great measures then proposed by the liberal ministers. He shared in the general unpopularity which afterwards attached to them, and when they were dismissed by William IV. in 1834, B. left office, never to return to it. After that time, he held in the upper house a position as nearly analogous as may be to that formerly held by him in the commons, criticising freely the conduct of successive administrations, and steadily forwarding every measure for social progress.

It will be as a law-reformer that B. will be best remembered. He took up Romilly's uncompleted task of carrying into practice the ameliorations suggested by Bentham. His efforts in this direction began as early as 1816, when he introduced into parliament a bill to remove various defects in the law of libel. In 1827, in a memorable speech which occupied six hours in delivery, B. enumerated the defects in nearly every branch of English law, and made proposals for dealing with law-reform on a proper scale. These, as might have been expected, met with little encouragement. It has been the fortune of many of his measures to be carried afterwards, in a mutilated form, by other hands. After he left office, B. also succeeded in carrying various reforms in the law, among which may be noted some very extensive changes in the law of evidence. Among the measures proposed by B., but left for future law-reformers to carry, were bills for the codification of the criminal law, for the establishment in England of a system of public prosecutors, and for the giving of compensation to parties acquitted. Lord B.'s acts and bills, as well those regarding the slave-trade, education, and other public questions, as those touching on law-reform, have been collected and published by Sir J. E. Eardly Wilmot (Lond., Longman, 1857). The large well-filled volume which they form is the most fitting monument that could be preserved of the activity, perseverance, and public spirit of the man.

As an orator, more especially as a debater in parliament, B. was, among the men of his time, inferior only to Canning. He was wont, however, to indulge in his speeches in too large an admixture of exciting elements: argument was mingled with fiery declamation; ridicule, sarcasm, invective, were freely used; and these he dealt out with a vehemence and energy that at times carried him far beyond bounds. The power of ready, rapid, and forcible diction was eminently his. In many other fields besides oratory, B. has won a high reputation. He cultivated mathematical and physical science with success, and ventured upon the domain of metaphysics, and even of theology. His miscellaneous writings are of great extent, and upon an almost incredible variety of subjects. They were, however, intended more to serve purposes of the moment, than as permanent additions to our literature; and though they display great powers of rapid comprehension and nervous clear exposition, it cannot be said that we are indebted to their author for any new truths in politics or morals, or any original discoveries in science. The honors due to men of letters B. did not fail to acquire, having successively been made lord rector of Glasgow University, president of University College, London, member of the Institute of France, chancellor of the University of Edinburgh, and lastly, D.C.L. of Oxford.

While not engaged in parliament, Lord Brougham resided chiefly at Cannes, in the s. of France, where he died May 7th, 1868. He married, in 1819, Mary Anne Eden, the granddaughter of a baronet in the co. of Durham. The issue of this marriage was two daughters, who both died before reaching womanhood. The patent of the title to the peerage was extended to make it descend to the family of his brother. B. left a memoir of his life and times, which was published in 3 vols. (1871).

**BROUGHAM, JOHN**, b. Ireland, 1810, d. N. Y. 1880, playwright, studied surgery for a considerable time, but was obliged to leave school on account of adversity, and went to London, where he proposed to enter the East India service; but an old man gave him a guinea, and urged him to seek some fitter employment. Happening to meet an old acquaintance, he got an engagement in the Prince of Wales theater, and there in July, 1830, he acted six parts in *Tom and Jerry*. In 1830, he was a member of the company organized by Madame Vestris. About this time he wrote his first play, a burlesque, prepared for William E. Burton, then acting in London. In 1840, he was a member of the Lyceum, for which theater he wrote a number of plays. He came to the United States in 1842, and appeared in the old Park theater in New York city. Soon after he joined Burton's company in Chambers street; and here also he wrote a number of plays, among which were *Vanity Fair*, *All is Fair in Love*, *Domby and Son*, and the *Irish Emigrant*. Afterwards he managed Niblo's Garden, and in Dec., 1850, he opened Brougham's Lyceum on Broadway, where he produced *David Copperfield*, and a new version of the *Adress of Padua*, the latter written for Charlotte Cushman. He then connected himself with Wallack's company, in which he remained until 1860; then managed the Bowery theater, reviving *King John* with superb scenery. Meanwhile he was writing plays, among which were the *Game of Love*, *Bleak House*, *A Decided Case*, *Game of Life*, *Playing with Fire*, *Pocahontas*, *Love and Murder*, *Romance and Reality*, etc. After several seasons at Wallack's, he rejoined Burton and produced his burlesque of *Columbus*, and other plays. In 1860, he went to England, where he remained five years, and there too he was writing and adapting plays, among them the *Duke's Motto*, for Mr. Fechter. He reappeared in New York in Oct., 1865, and not long after again joined Wallack's company, with which he remained until the close of his life. Among his later plays are *John Garth*, and *The Lily of France*.

**BROUGHTON, JOHN CAM HOBHOUSE**, Lord, 1786-1860; an English statesman. At his death the peerage became extinct, as he left no male issue. In his school days at Cambridge he was the intimate friend of Byron, and the two made a tour of southern Europe at a later period. He was a radical, and, in 1816, wrote a book to correct certain current misrepresentations of the events of the *Hundred Days in Paris*. The work gave great offense both in England and France. The translator and printer in Paris were sentenced to fine and imprisonment for an "atrocious libel," and in London he was confined in Newgate nearly three months. As a martyr to toriyism, he tried for parliament in the borough of Westminster, but was defeated, though chosen by a large majority only two years later. For 12 years he was an ardent and courageous advocate of liberal measures, among them the repeal of the test and corporation acts, and Roman Catholic emancipation. In 1831, he became a baron, and in the same year was secretary of war in the Grey ministry. Subsequently he was chief commissioner of woods and forests, and president of the board of control. In 1851, he became a peer, and ceased to participate in public life. Lord B. published *Imitations and Translations from the Classics*; *Journey through Albania with Lord Byron*; and *Historical Illustrations of the Fourth Canto of Orlando Harold*.

**BROUGHTON, RHODA**, a popular novelist, the daughter of a clergyman, was born in Wales in 1840, but spent much of her life in Oxford. Among her works, all of which are clever and entertaining, but of inferior literary quality, are: *Cometh up as a Flower* (1867); *Not Wisely but too Well* (1867); *Red as a Rose is She* (1870); *Nancy* (1878); *Joan* (1876); *Belinda* (1883); *Doctor Cupid* (1886); *Alas!* (1890); *Scylla or Charybdis* (1895), etc.

**BROUS'SA**, or **BOUR'SA**, the ancient *Prusa*, where the kings of Bithynia usually resided, situated in lat. 27° n., long. 40° e., at the foot of Mt. Olympus, in Asia Minor. Prusa is said to have been built by Prusias, king of Bithynia, who waged war with Croesus or Cyrus. Selfeddulat, of the race of Hamadan, took it in 336 of the Hegira, but it was retaken by the Greek emperor in 947 A.D. In 1356, Orkhan, son of Othman, the second emperor of Turkey, captured it, and made it the capital of his empire, and it continued so until the Sultan Amurat II. removed the capital to Adrianople. The Tartars plundered it in 1402. It successfully withstood the attack of the Karamanians in 1418, but in 1512 it was taken by Ala Eddin. Ibrahim Pasha seized it in 1833, and from 1852 to 1855 it afforded a refuge to Abdel Kader. Besides these vicissitudes it has suffered much from fire and earthquakes.

B. is most pleasantly situated, facing a beautiful and luxuriant plain, covered for many miles with plantations of mulberry-trees. The city and suburbs are about 6 m. in circumference. The town is divided from the eastern suburb by a deep channel or vale, over which there are several bridges, one of them—with shops on each side—being 90 paces long and 16 broad. The streets are remarkably clean, and the bazars very good, being supplied with European goods from Constantinople. The population of Broussa is estimated at 75,000. It contains a great number of mosques, some of which are very fine buildings. The silks of B. are much esteemed in the European markets, and great quantities were formerly exported. It is the seat of an Armenian and Greek archbishop. Meerschaum clay is found near by, and there are many hot springs on the spur of the mountain in the vicinity. The waters are mostly alkaline, and are used for bathing. On a rock near the center of the town stands the citadel. Caravans conduct the trade with the interior, but a railway connects the city with the Port of Mudania on

the Sea of Marmora. In 1855 it was nearly destroyed by an earthquake. In a neighboring village are the tombs of Orkhan and Othman. The growth of the city has been very rapid since the Russo-Turkish war, and it is still an important commercial center, although some of the manufactures for which it was formerly famous, for example that of chinaware, have declined.

**BROUSSAIS, FRANÇOIS JOSEPH VICTOR**, the founder of the physiological system of medicine, was b. at St. Malo, Dec. 17, 1772, and, after studying at Dinon, served for a time in the navy, and then in the army. In 1820, he was appointed first professor at the military hospital of Val-de-Grace. In 1830, he became professor of general pathology and therapeutics in the faculty of medicine in Paris, and afterwards was made a member of the institute. He died at his country residence at Vitry, Nov. 17, 1838. In 1841, a statue was erected to his memory in the court of Val-de-Grace. B.'s peculiar views are ably explained in his chief works—the *Histoire des Phlegmasies ou Inflammations Chroniques* (1808), and *Examen de la Doctrine Médicale généralement adoptée* (1816), which assert the following principles: that life is sustained only by excitation; that this excitation may be either too strong (*surexcitation*) or too weak (*adynamie*), the latter case, however, being far less frequent than the former. These abnormal conditions of surexcitation and adynamie at first manifest themselves in a specific organ of the body; but afterwards, by sympathy, are extended to other organs; that is, all diseases are originally local, and become general only by sympathy of the several organs. The organs most subject to disease are the stomach and bowels, and therefore *gastro-enteritis* (inflammation of the stomach and the intestines) is the basis of pathology; consequently, B. resorted to local phlebotomy—especially the application of numerous leeches to the region of the abdomen—as a remedy in fevers and various diseases. His theory and practice gained many adherents in France, who took the name of the "physiological school." But a more exact knowledge of physiology has demonstrated that the views of B. were one-sided and exaggerated. Yet they have not been without use in pathology, as they have led to a more careful study of pathological anatomy and physiological sympathies, and to a more exact observation of the so-called specific morbid processes of which the existence was denied by B. and his followers. Montègre, *Notice Historique sur la Vie, les Travaux, et les Opinions de Broussais*.—His son, CASSIMIR B., born 1808, professor at Val-de-Grace (1833), was a zealous adherent of the Broussais system, and is the writer of a work, *Hygiène-Morale*, based on phrenology.

**BROUSSON, CLAUDE**, 1647-98; a French Protestant, an advocate and legal defender of the Huguenots. His house was the rendezvous of certain leaders of an outbreak, and he was compelled to fly from the city (Toulouse), barely escaping into Switzerland. He ventured into France twice afterwards, at great peril; but in 1698 he was caught, after many escapes, and sentenced to be broken on the wheel on the charge of treasonable conspiracy with the duke of Schomberg to invade France. He was executed accordingly, Nov. 4, 1698. He left a number of works on the subjects of the period.

**BROUSSONET, PIERRE MARIE AUGUSTE**, 1761-1807; a French naturalist educated in medicine, and a professor at the age of 18. He labored zealously to establish the Linnæan system of botany in France, and visited England, where he was admitted to the royal society, publishing in London *Ichthyologie Decas I.* In Paris he was perpetual secretary of the society of agriculture, and a member of the electoral college of the city. Subsequently he visited Madrid and Lisbon, and went as physician to an embassy which the United States sent to the emperor of Morocco. Still later he was French consul at Teneriffe; in 1797 a member of the institute, and in charge of the botanical garden at Montpellier. He died of apoplexy soon after his election to the national legislative body. France is indebted to him for the introduction of the Merino sheep and the Angora goat.

**BROUSSONETIA.** See MULBERRY.

**BROUWER, ADRIAN**, about 1606-88; a Dutch painter. He was apprenticed to Franz Hals. He was improvident and dissipated, and his pictures deal chiefly with drinking scenes and tavern life. They show great skill in coloring and cleverness in characterization. The best collection is in the Munich gallery.

**BROWN**, a co. in Illinois, on the Illinois river; 800 sq. m.; pop. '90, 11,951. In part prairie and in part wooded with fertile and well-cultivated soil. It is intersected by the Toledo, Wabash, and Western railroad. Agriculture is the main business. Co. seat, Mount Sterling.

**BROWN**, a co. in s. Indiana; 330 sq. m.; pop. '90, 10,308; well wooded, and with tolerably productive soil. Agriculture is the chief occupation. Co. seat, Nashville.

**BROWN**, a co. in n.e. Kansas on the Nebraska border; 576 sq. m.; pop. '78, 10,446; in '90, 20,319. The co. is crossed by the Missouri Pacific and the St. Joseph and Grand Island railroads. Productions, grain, hay, butter, and cattle. Co. seat, Hiawatha.

**BROWN**, a co. in s. Minnesota, on the Big and Little Cottonwood; 585 sq. m.; pop. '90, 15,817; Chief business, agriculture. Co. seat, New Ulm.

**BROWN**, a co. in n. Nebraska; area, 1020 sq. miles; pop. '90, 4359. It is drained by Niobrara river, bounding it on the n., and crossed by the Fremont, Elkhorn and Missouri Valley railroad. Co. seat, Ainsworth.

**BROWN**, a co. in s.w. Ohio, on the Ohio river; 400 sq. m.; pop. '70, 30,802; in '90, 29,889. Hilly near the river, but level inland; fertile and well cultivated. Produces grain, butter, sorghum molasses, and some wine. Co. seat, Georgetown.

**BROWN**, a co. in n.e. S. Dakota, formed 1879 and organized 1880; 1720 sq. m.; pop. '90, 6737. It is drained by the James river. Co. seat, Aberdeen.

**BROWN**, a co. in c. Texas, on Colorado river; 900 sq. m.; pop. '90, 11,359. Hilly and prairie surface, with rich soil. Chief business, stock raising. Co. seat, Brownwood.

**BROWN**, a co. in e. Wisconsin at the head of Green bay; 530 sq. m.; pop. '90, 39,164. Uneven surface; productions agricultural. The Chicago and Northwestern and several other railroads pass through. Co. seat, Greenbay.

**BROWN, BENJAMIN GRATZ**, b. Ky., 1826; graduate of Yale; made his home in St. Louis, and in 1852 was a member of the legislature. In 1854, he started the *Missouri Democrat*. In the civil war he fought for the union, commanding a brigade. In 1863 he was a United States senator from Missouri, and in 1872 was the democratic candidate for vice-president. He d. 1885.

**BROWN, CHARLES BROCKDEN**, a celebrated American novelist, was b. at Philadelphia, Jan. 17, 1771. His early education was carried on under the care of Mr. Robert Proud, author of the *History of Pennsylvania*. Afterwards he studied for the law, but the license which he had already given to his imagination induced an unconquerable aversion to legal pursuits, and he consequently betook himself to literature. The French revolution exercised on him, as on many other ardent spirits, a considerable influence; several of his writings at this period being penetrated with the new thoughts and sentiments which sprung out of that great convulsion. In 1798, he published *Wieland*, the first of his remarkable fictions; and in 1799, *Ormond, or the Secret Witness*. His next production was *Arthur Mervyn, or Memoirs of the Year 1793*—the fatal year of yellow-fever in Philadelphia. In 1801, appeared *Edgar Huntly, or the Adventures of a Sleep-Walker*, "a romance presenting a greater variety of wild and picturesque adventure, with more copious delineations of natural scenery, than is to be found in his other works."—*Prescott*. This was followed in the same year by *Clara Howard*, and in 1804 by *Jane Talbot*, first printed in England. He died of consumption in 1810.

**BROWN, FORD MADOX**, b. Calais, France, of English parents, 1831. He studied art on the continent, and in 1844 sent two cartoons to Westminster Hall which won the admiration of Haydon and of Dante Rossetti. A warm friendship resulted between Rossetti and himself, and when the former founded the Pre-Raphaelite Brotherhood, B., though he held himself aloof from actual membership in the society, was generally looked upon as one of its master spirits. Among his best known pictures are "Wicliff reading his Translation of the Scriptures," 1848; "King Lear," 1849; "Chaucer at the Court of Edward III., 1851; "Christ Washing Peter's Feet," 1852; an historical series in the Town Hall, Manchester, 1890; etc. He d. in 1893.

**BROWN, FRANCIS, D.D.**, 1784-1820; a native of New Hampshire, and graduate of Dartmouth college, of which he became president in 1815. Some of his sermons and pamphlets have been published.

**BROWN, FRANCIS; D.D.**, educator; b. in Hanover, N. H., Dec. 26, 1849; graduated at Dartmouth college in 1870, and at the Union theological seminary in 1877; became instructor in Biblical philology at the seminary in 1879 and associate professor in 1881; and was made professor of Hebrew and the cognate languages there in 1890. His publications include *Assyriology, its Use and Abuse in Old Testament Study*.

**BROWN, Sir GEORGE**, a distinguished British gen., b. at Linkwood, near Elgin, Scotland, in Aug., 1790; entered the army in 1806, became lieut. in 1807, and was present in the latter year at the capture of Copenhagen. He served in the peninsular war. At the battle of Talavera he was severely wounded, and at the storming of Badajoz was one of the forlorn-hope. He was appointed maj., May 26, and Lieut. col., Sept. 29, 1814, in which year he embarked in Maj. gen. Ross's expedition against the United States of America, and was wounded at the battle of Bladensburg. From Feb. 6, 1824, to 1842, he commanded a battalion of the rifle brigade. He was made adj. gen. of the forces, April, 1850, and lieut. gen., 1851. In the Crimean war, 1854-55, B. commanded the light division. At the battle of Inkerman, Nov. 5, 1854, he was severely wounded, and obliged to retire for a short time to Malta. In 1855, he was created a knight commander of the Bath. In the expedition to the Sea of Azof, he commanded the British troops; and in the first unsuccessful attack on the Redan of Sebastopol, he had the chief command of the storming-party. He was gazetted, April 3, 1856, "gen. in the army for distinguished service in the field." He was a knight of Hanover, received the Turkish order of the Medjidie of first class in 1855; and the grand cross of the legion of honor, 1856. In 1860, he became commander-in-chief in Ireland, and in 1862 a privy-councillor. He died in 1865.

**BROWN, GEORGE**, naval officer; b. in Indiana, June 19, 1835; became a midshipman in the U. S. navy 1849, commander 1866, captain 1877, commodore 1887, and rear-admiral 1893; and was commandant of the naval station and yard at Norfolk, Va., in 1893-7. He retired in 1897.

**BROWN, GEORGE LORING**, b. 1814 in Boston; an American painter, of whose productions the more notable are "The Crown of New England" (the White Mountains), and "The Harbor of New York." He d. 1889.

**BROWN, GOULD, 1791-1867**; a grammarian; b. in Rhode Island; for 30 years a teacher in New York, and author of several elementary and progressive works on English grammar, the most important of which is his *Grammar of English Grammar*.

**BROWN, HENRY ARMITT, 1844-78**; b. Philadelphia; graduated at Yale coll.; was admitted to the bar, but distinguished himself chiefly as a political orator. He earnestly advocated the cause of municipal reform in Philadelphia, made numerous speeches throughout the country in favor of Rutherford B. Hayes during the presidential campaign of 1876, and delivered brilliant addresses on anniversary and festival occasions, etc. A posthumous collection of his speeches, with a memoir, appeared in 1880.

**BROWN, HENRY BILLINGS**, associate justice of the U. S. Supreme Court, was born at Lee, Mass., in 1836. He was graduated from Yale college in 1856, and then traveled in Europe for a year. Upon his return he studied law at the Yale and Harvard law schools, and, upon graduating, removed to Detroit, Mich., where he was admitted to the bar in 1860. For several years he was assistant United States district attorney in that district of the Federal court, and in 1868 he was, by appointment, for several months judge of the Circuit Court of Wayne county. In 1876 he was appointed by President Hayes United States district judge for the eastern district of Michigan. In 1875 he compiled a volume of admiralty reports, and in Dec., 1890, was appointed by President Harrison to the vacancy on the supreme court bench caused by the death of Justice Samuel Miller.

**BROWN, HENRY KIRKE, b. Mass., 1814**; an American sculptor, well known for works in bronze. He studied portrait-painting in Boston, and after spending some years in Italy, settled in Brooklyn, N. Y. He made the first bronze cast achieved in the United States. Some of his figures are "Hope," "The Pleiades," "The Four Seasons," and statues of De Witt Clinton, Washington, Nathaniel Greene, Lincoln, and Gen. Scott. He d. 1896.

**BROWN, JACOB, 1775-1823**; an American general commanding on the Canadian frontier in the war of 1812; he showed skill and courage in the defense of Sackett's Harbor, and in the battles of Chippewa and Niagara Falls. In 1831 he was chief in command of the United States army.

**BROWN, J. APPLETON, b. Mass., 1844**; landscape painter; resident of New York. He studied mainly under Lambinet, of Paris. Among his works are "Old Road near Paris," and "On the Merrimack near Newburyport."

**BROWN, JAMES BALDWIN, D.D., 1820-84**; b. England; for many years pastor of the Independent church at Brixton, London; was elected chairman of the Congregational Union of England and Wales, 1878. He was widely known and honored as a preacher, scholar, and author. His books have found many admiring readers in the U. S.

**BROWN, JOHN, of Haddington**, once the most popular, and still among the most revered, theological writers in Scotland, was b. in 1722, at Carpow, near Abernethy, in Perthshire. Deprived of both his parents when only 11 years of age, he became assistant to a venerable and pious shepherd, named John Ogilvie, who tended his flock among the neighboring hills, and nursed the religious ardor of the boy's heart. B., however, aspired to be wise as well as good. His thirst for learning was insatiable, and the most romantic yet well-accredited stories illustrative of this are related by his biographers. While still a friendless herdsman he had made great progress in a self-acquired knowledge of Greek and Latin. The extent of his acquisitions, even at this early time, may be estimated from the fact, that the country people round about believed he was in league with the devil, and that he had pledged his soul for unhallowed lore. At a later period of his life, "he knew nine or ten languages, classical, oriental, and modern, and had amassed vast stores of Puritan, Scottish, and Dutch divinity." After a brief career as a peddler—an employment which English readers will understand from Wordsworth's *Excursion* was neither mean nor degrading—B. became a volunteer in a regiment of militia raised in Fifeshire during the rebellion of 1745, and in 1747, schoolmaster in the neighborhood of Kinross. During the vacations of his school, he studied philosophy and divinity under the inspection of the Associate Synod, and the superintendence of the Rev. Ebenezer Erskine and James Fisher. In 1750, he was ordained pastor of the Secession church at Haddington. Perhaps a more faithful, industrious, and holy minister never labored in Scotland. David Hume was once prevailed upon to go and hear him, and the criticism of the great skeptic was: "That old man preaches as if Christ were at his elbow." Although self-educated, he had little of the narrowness which culture so obtained generally brings along with it; he corresponded on friendly terms with Episcopalians, and often expressed a warm affection for all true Christians. Although himself a sound Presbyterian, and a tolerably strict Calvinist, "the love of the Lord" was his real and ultimate test of a man's orthodoxy. In 1758, B. first appeared as an author. His work was entitled *A Help for the Ignorant*, etc. In 1763, he published his famous *Christian Journal*, in which the common events of life are richly but quaintly, and perhaps somewhat artificially, spiritualized. In 1768, he was appointed professor of divinity under the Associate Synod, and in the same year issued his valuable *Dictionary of the Holy Bible*. In 1771, appeared his *History of the Church from the Birth of the Saviour*—a work good enough for cottage-reading, but possessing no merit otherwise; and in 1778, *The Self-interpreting Bible*. This last is B.'s *magnum opus*, and has been amazingly popu-



lar in Scotland; even high dignitaries of the English church have praised and recommended it. Besides these works, B. published a great variety of sermons, tracts, etc., which had an extensive popularity. He died on 19th June, 1787.

**BROWN, JOHN, M.D.**, founder of the Brunonian system of medicine, the son of a day-laborer, and himself first intended for a weaver, b. in 1736, in Bunkle parish, Berwickshire, was educated at the grammar-school of Dunse, in which he was subsequently an usher. After studying medicine at the Edinburgh university, he became tutor to the children of the celebrated Dr. Cullen, and assistant in his university lectures. Conceiving himself slighted by Cullen, he commenced giving lectures himself upon a new system of medicine, according to which all diseases are divided into the sthenic, or those depending on an excess of excitement, and the asthenic, those resulting from a deficiency of it; the former to be removed by debilitating medicines, as opium, and the latter by stimulants, such as wine and brandy. His system gave rise to much opposition, but his partisans were numerous; for a time his opinions had some influence. In 1779, B. took the degree of M.D. at the university of St. Andrews, and in 1780 published his *Elementa Medicinæ*. He was also author of *Observations on the Old System of Physic*. In 1786, being overwhelmed with debt, he removed to London, where he died of apoplexy in 1788. His works, with a memoir by his son, Dr. William Cullen Brown, appeared in 1804 (3 vols. 8vo).

**BROWN, JOHN, 1736-1803**; merchant of Providence, R. I.; the leader of the men who destroyed the *Gaspes*, an English sloop of war, June 17, 1772. He was arrested and put in irons, but escaped. He was a member of congress from Rhode Island, and a patron of Brown university.

**BROWN, JOHN, 1744-80**; graduate of Yale, and king's attorney in New York. In 1775 he was an emissary in Canada to provoke the people against the English government. He was with Allen at the capture of Ticonderoga, and at Quebec when Wolfe was killed. He was killed by Indians while on the way to help Schuyler in the Mohawk valley campaign.

**BROWN, JOHN, 1757-1837**; b. Va.; soldier in the revolutionary army. He was a student at Princeton and at William and Mary college; and after residing in Kentucky for a few years, returned to Virginia, and represented that state in congress, 1787-93. From 1793 to 1805, he was United States senator from Virginia.

**BROWN, JOHN, D.D.**, grandson of John Brown, of Haddington, was b. 12th July, 1784, near Whitburn, Linlithgowshire. He studied at Edinburgh university, and afterwards at the theological hall of the secession church in Selkirk. In 1806, he was ordained to the pastorate of a church in Biggar, a small town in Lanarkshire, where he labored for 15 years, employing his leisure hours in those studies which subsequently enabled him to take a high rank as a biblical expositor. In 1822, he was transferred to Rose street church, Edinburgh, and in 1829 to Broughton place church in the same city. In 1834, he was appointed professor of pastoral and exegetical theology in connection with the associate synod. He died 18th Oct., 1858. As a preacher, Dr. B. was among the first of his time. For clearness of scriptural exposition, chaste and powerful language, and majestic ardor and earnestness of manner, he had no equal in his denomination, and no superior in Scotland. The attractiveness of his delivery was heightened by a countenance singularly noble, tender, and sweet. Among his works are *The Law of Christ respecting Civil Obedience*; *The Resurrection of Life*; and his important and scholarly *Expository Discourses on the Epistles of Peter, on the Epistle to the Galatians, and on the Epistle to the Romans*. See Dr. Cairns's Memoir (1860).

**BROWN, JOHN, M.D.**, physician and author, son of the preceding, b. in 1810; studied in the university of Edinburgh, and practiced medicine in that city. His practice was successful, but not large, and his fame rests mainly on his literary works, which consist of three volumes of sketches termed *Hours Subæcivæ* ("leisure hours") in 1858-61, and *John Leech and Other Papers* in 1862. The style of these writings is humorous and pathetic, and they deal chiefly with homely subjects. The little sketches termed *Rob and his Friends* show his best qualities and have obtained great popularity for their quaintness, delicacy and clear and pleasing style. His literary motto was that an author should not publish anything "unless he has something to say and has done his best to say it aright," and for this reason he published but little, distrusting his own powers and subjecting what he wrote to the severest criticism. He died in 1882 after an uneventful and somewhat melancholy life. See *Recollections of Dr. John Brown* by A. Peddie in 1893.

**BROWN, JOHN**, was born in Conn., May 9, 1800; d. Dec. 2, 1859; an abolitionist, celebrated as the originator of the insurrection at Harper's Ferry. He was intended for the ministry, but was compelled to give up study on account of inflammation in his eyes. With his family he removed to Ohio, where he worked as a tanner, and engaged in the wool trade, in which he failed. He then went to Essex co., N. Y., and began as a farmer, but in 1854 followed his four sons, who had settled in Kansas, and were subjected to much persecution on account of their opposition to slavery. When the free-state men organized to repel the Missourians who were besieging Lawrence, Brown and his sons were among the foremost on the free-state side; and a little later they made a remarkable defense against vastly superior numbers near Ossawatimie. After many

rough adventures in the Kansas troubles, B. formed the project of an insurrection in the south among the slaves as the surest means of securing their liberation. He drilled a small force in Iowa in the winter of 1857, and the next spring, in Canada, drew up a new provisional constitution for the states, under which he was selected as commander-in-chief, one of his sons, and Richard Realf and John Kagi, being civil officers. The next important event was the rescue by B. of certain slaves in Missouri who had been sold and were to be taken to Texas, one of the owners of the property being slain in the conflict. Again he went to Canada, returning to the United States in the summer. His attempt to capture the arsenal at Harper's ferry was made on Sunday night, Oct. 16th, 1859. The arsenal was easily seized, several citizens were taken into custody, conspicuous houses were searched for arms, and few of the citizens knew what was going on until mid-forenoon, when they began to rally; some scattered firing followed, one colored man was killed (by Brown's men), the mayor was slightly hurt, and so was one of Brown's sons. There was no sign of a rising of negroes, and before noon Brown and his men were in the arsenal, virtually prisoners. A feeling of rage prevailed so strongly, that a man who came from the arsenal with a flag of truce was instantly killed, and one prisoner was put to death. At night Brown had three unwounded whites and a few useless negroes for his army; one of his sons lay dead, and another was badly wounded. In the morning a force of United States marines arrived, and Brown, fighting desperately to the last, was taken prisoner, being wounded once with a sword, and twice with the bayonet. All of the invaders were indicted for conspiring to incite insurrection, and for murder and treason. After a trial of three days, in which Brown was unable, on account of his wounds, to stand up; he was found guilty, and sentenced to death on the scaffold within 48 hours. He died calmly on the 2d of Dec., 1859.

**BROWN, JOHN GEORGE**, genre painter; b. Durham, England, 1831; educated in the Royal Scottish Academy and the National Academy of Design in New York; lived in New York after 1853; became an academician in 1863; and subsequently president of the American water-color society. He delights in portraying city and country life, with child figures.

**BROWN, JOHN YOUNG**, b. Ky., 1835; graduated at Centre coll., Danville, Ky., 1855; admitted to the bar, 1857. He was elected to the XXXVIth congress, but not having attained the age required by the constitution of the U. S., was not allowed to take his seat until the second session. He was elected to the XLth, XLIIIrd, and XLIVth congresses; and governor of Kentucky, 1891.

**BROWN, JOSEPH EMERSON**, b. S. Car., 1821; graduated at Yale law school; began practice, 1846; elected to the state senate, 1849; elected gov. of Ga. by the democrats, 1857; re-elected, 1859; and again elected, 1861, over two opposing candidates. He was active as a war governor during the rebellion, opposing pres. Davis on the conscript act. After the war B. became a prominent reconstructionist, voting for Gen. Grant, against the wishes of the majority of his party. He suffered the only political defeat of his life in 1868, when, as the republican candidate for U. S. senator, he was beaten by Joshua Hill, dem. He was appointed chief justice of the Supreme court of Ga., became a reconstructionist democrat, was elected to the U. S. senate, 1879, 1884, and gave \$50,000 each to the university of Georgia and the Southern Baptist Theological Seminary, He d. in 1894.

**BROWN, NICHOLAS**, 1790-1841; b. R. I.; the chief patron of Brown university, which in 1804 changed its name in his honor from Rhode Island college.

**BROWN, or BROWNE, ROBERT**, 1540-1632; an English clergyman, founder of the sect of Brownists, was born at Toilethorpe, Devonshire; was educated at Benet (Corpus Christi) college, Cambridge, and after serving as domestic chaplain to the duke of Norfolk, taught school in Southwark and gave private religious instruction, then returned to Cambridge, where he was offered a pulpit, but refused to be licensed by a bishop, and soon was inhibited from preaching at all. In 1579 he formed at Norwich a Separatist church, and after being imprisoned for his opinions, emigrated, 1580, with his flock to Middleburg, Zeeland, where he published (1582-83) several controversial books, including *A Treatise of Reformation without Tarrying for Anie*, and *A Booke which Sheweth the Life and Manners of all true Christians*. Dissensions arising in his congregation, he repaired to Scotland, 1583, where he assailed the order and discipline of the Presbyterian church, then returning to England, was excommunicated (about 1586), which led him to become "reconciled" to the English church. He was elected master of St. Olave's grammar school, Southwark, and in 1591 was made rector of a church near Oundle, Northamptonshire. Some writers represent him as ever hot-headed and quarrelsome (he was imprisoned on various charges thirty-two times); others, as an ambitious fanatic. Dexter, *Congregationalism of the Last Three Hundred Years*, defends the sincerity of his aims in early life, and avers that "he anticipated, by two generations, Roger Williams as an advocate of the doctrine of toleration and of liberty of conscience." Brown and his followers objected to certain doctrines of the established church, as well as to its government, nor would they commune with other reformed churches, because they tolerated "unregenerate" persons as members. They held marriage to be a civil contract, refused the baptism of the children of those not church members, rejected forms of prayer, and would have every church independent, and place all power in the hands of the laity. See BROWNISTS and INDEPENDENTS.

**BROWN, ROBERT**, an eminent botanist, the son of an Episcopal clergyman, was b. at Montrose, Scotland, Dec. 21, 1773, and educated at Marischal college, Aberdeen. Having studied medicine at the university of Edinburgh, he became, in 1796, ensign and assistant-surgeon in a Scottish fencible regiment, with which he went to Ireland. Devoting himself to the study of botany, he resigned his commissions in 1800, and the following year was, on the recommendation of sir Joseph Banks, engaged as naturalist in the expedition sent out under Capt. Flinders for the survey of the Australian coast. On his return, in 1805, he brought home nearly 4000 species of Australian plants, a large proportion of which were new to science. Soon after, he was appointed librarian to the Linnean society. To the *Transactions* of the Edinburgh Wernerian society and those of the Linnean society, he contributed memoirs on *Asclepiades* and *Proteaceae*, and published *Prodromus Florae Novae Hollandiae et Insulae Van Diemen's*, vol. i. 1810; a supplement to this work appeared in 1830, relating to the *Proteaceae* only. He also wrote the *General Remarks, Geographical and Systematical, on the Botany of Terra Australia*, attached to the narrative of Capt. Flinders' expedition, 1814. His adoption of the natural system of Jussieu, the French botanist, led to its general substitution in place of the Linnean method. B.'s numerous memoirs in transactions of societies, and other contributions to botanical science, secured for universal approval the title conferred on him by Alexander von Humboldt of *Botanicorum facile Princeps*. In 1810, B. received the charge of the library and splendid collections of sir Joseph Banks, which, in 1837, were transferred to the British museum, when he was appointed keeper of the botanical department in that establishment. In 1811, he was elected F.R.S.; in 1833, D.C.L. of Oxford; and in 1833 was elected one of the 18 foreign associates of the academy of sciences of the institute of France. In 1839, the royal society awarded him their Copley

**BROWN**, his *Discoeries during a Series of Years on the Subject of Vegetable Impregnation*. 1775 he was an emissary in Canada society from 1849 to 1853. He died in London, ment. He was with Allen at the capture of works, in 5 vols. 8vo, has been published in was killed. He was killed by Indians while on the valley campaign.

**BROWN, JOHN**, 1757-1837; b. Va.; soldier in the revolution; retired captain in 1842; and student at Princeton and at William and Mary college; and after as the designer and for a few years, returned to Virginia, and represented that state in Tweed at Berwick, From 1793 to 1805, he was United States senator from Virginia.

**BROWN, JOHN, D.D.**, grandson of John Brown, of Haddington, was b. at Dartmouth near Whitburn, Linlithgowshire. He studied at Edinburgh university, and asor in Dart-the theological hall of the secession church in Selkirk. In 1806, he was ordy college in pastorate of a church in Biggar, a small town in Lanarkshire, where he laboate; Biog-years, employing his leisure hours in those studies which subsequently enabled take a high rank as a biblical expositor. In 1822, he was transferred to Ros church, Edinburgh, and in 1829 to Broughton place church in the same city. In of the he was appointed professor of pastoral and exegetical theology in connection with to associate synod. He died 13th Oct., 1858. As a preacher, Dr. B. was among the firhis time. For clearness of scriptural exposition, chaste and powerful language, hima majestic ardor and earnestness of manner, he had no equal in his denomination, and esse superior in Scotland. The attractiveness of his delivery was heightened by a countin nance singularly noble, tender, and sweet. Among his works are *The Law of Christs respecting Civil Obedience*; *The Resurrection of Life*; and his important and scholarly *Expository Discourses on the Epistles of Peter, on the Epistle to the Galatians, and on the Epistle to the Romans*. See Dr. Cairns's Memoir (1860).

**BROWN, JOHN, M.D.**, physician and author, son of the preceding, b. in 1810; studied in the university of Edinburgh, and practiced medicine in that city. His practice was successful, but not large, and his fame rests mainly on his literary works, which consist of three volumes of sketches termed *Hours Subsecivae* ("leisure hours") in 1858-61, and *John Leech and Other Papers* in 1882. The style of these writings is humorous and pathetic, and they deal chiefly with homely subjects. The little sketches termed *Rab and his Friends* show his best qualities and have obtained great popularity for their quaintness, delicacy and clear and pleasing style. His literary motto was that an author should not publish anything "unless he has something to say and has done his best to say it aright," and for this reason he published but little, distrusting his own powers and subjecting what he wrote to the severest criticism. He died in 1882 after an uneventful and somewhat melancholy life. See *Recollections of Dr. John Brown* by A. Peddie in 1893.

**BROWN, JOHN**, was born in Conn., May 9, 1800; d. Dec. 2, 1859; an abolitionist, ch celebrated as the originator of the insurrection at Harper's Ferry. He was intended for the ministry, but was compelled to give up study on account of inflammation in his phy eyes. With his family he removed to Ohio, where he worked as a tanner, and engaged in the wool trade, in which he failed. He then went to Essex co., N. Y., and began 1830, a farmer, but in 1854 followed his four sons, who had settled in Kansas, and were s gone fected to much persecution on account of their opposition to slavery. When the f notice. state men organized to repel the Missourians who were besieging Lawrence, Brown o over his sons were among the foremost on the free-state side; and a little later they ma institute remarkable defense against vastly superior numbers near Ossawatimie. After n

a new and simplified scheme of mental phenomena. The greater part of this new philosophy was the production of his first session as professor, the writing of each lecture being begun on the evening previous to its delivery. A philosophic system thus improvised could not but be crude and inconsistent, however acute and imaginative its author might be. B.'s chief contribution to psychology is the establishment of a sixth or *muscular sense*.

**BROWN, THOMAS ALEXANDER** (pen name, Rolf Boldrewood), b. in England, in 1826; went to Australia in 1830; was active in the early public life of Melbourne and Sydney; and after 1865 was a police magistrate and gold fields commissioner. His best known works are *Ups and Downs*; *The Miner's Right*; *Robbery under Arms*; *The Squatter's Dream*; *A Sydney-Side Sazon*; *An Australian Squire*; *A Colonial Reformer*; *A Modern Buccaneer* (1894), *Old Melbourne Memories* (1896), etc.

**BROWN, ULYSSES MAXIMILIAN**, 1705-57; after studying at Limerick, Rome, and Prague, he entered the Austrian army, serving with distinction in Corsica and Italy, and rising rapidly in rank. In 1739 he was field-marshal lieutenant, and one of the aulic council. He was field-marshal in the seven years' war, repulsed the Prussians at Lowositz, and was mortally wounded in the great battle of Prague.

**BROWN, SIR WILLIAM**, founder of the free public library at Liverpool, b. at Ballymena, Ireland, 1784; was educated at Catterick, near Richmond, Yorkshire; and in his 16th year accompanied his parents to the United States. Employed in the counting-house of his father, who was engaged in the linen trade in Baltimore, in a few years he was admitted a partner. Returning to England in 1809, he established a branch of the business at Liverpool, and laid the foundation of one of the largest mercantile firms in the world. Embarking in the American trade, he became an extensive importer of cotton, and by his rare energy, quick business habits, and sterling integrity, soon became distinguished for the magnitude of his dealings. A liberal reformer, he took a prominent part in local and public affairs, and unceasingly promoted the education of the people. In 1844, he contested s. Lancashire upon the anti-corn-law league interest without success, but was returned to parliament for that division of the country in 1846, and was subsequently three times re-elected. A series of letters in defense of free-trade, which, in 1850, he contributed to the *Pennsylvanian* (Boston newspaper), attracted much attention. He was also an able advocate for the adoption of a decimal coinage. In 1857, he munificently subscribed £30,000 for the establishment of a free public library at Liverpool, and the noble building erected for the purpose owes its existence entirely to his generosity. He died in 1864.

**BROWN, WILLIAM LAWRENCE**, 1755-1830; minister of the English church at Utrecht, and successor of his father and uncle. He was also professor of moral philosophy and ecclesiastical history in the university, to which was added a professorship of the law of nature. After the French revolution he escaped to England, and at a later period became principal of Marischal college, Aberdeen. In 1800, he was chaplain to the king, and in 1804 dean of the chapel royal. His best known works are *Essay on the Natural Equality of Man*; *On the Existence of the Supreme Creator*; and on the existing religions with regard to their moral tendency.

**BROWN COAL**, a mineral substance of vegetable origin, like common coal, but differing from it in its more distinctly fibrous or woody formation, which is sometimes so perfect that the original structure of the wood can be discerned by the microscope, whilst its external form is also not unfrequently preserved. In this state, it is often called *wood coal*; and it sometimes occurs so little mineralized, that it may be used for the purposes of wood, as at Vitry, on the banks of the Seine, where the wood-work of a house has been made of it. From this to the most perfectly mineralized state, it occurs in all different stages. It is often brown or brownish-black, more rarely gray. It burns without swelling or running, with a weaker flame than coal; emits in burning a smell like that of peat, and leaves an ash more resembling that of wood than of coal. Wherever it occurs in sufficient abundance, it is used for fuel, although very inferior to common coal. *Bovey coal*, so called from Bovey Tracey, in Devonshire, where extensive beds of it occur, and where it has long been wrought, is B. C., and often exhibits the woody structure very beautifully. B. C. occurs in a number of other places in Britain, and more abundantly near Paris, and in Liguria and Hanover, where it forms thick beds in alluvial deposits.—The *urturbrand* (q.v.) of Iceland is regarded as a variety of it. *Jet* (q.v.) is also sometimes regarded as a variety of brown coal. Although bearing the name coal, B. C. is rather a kind of *lignite* (q.v.) than of coal.

**BROWNE, CHARLES FARRAR**, an American humorist, better known as "ARTEMUS WARD," was b. in Waterford, Me., in 1834, and after passing through the free village school entered a printing-office. As a printer's boy, he worked in all the principal towns in New England, until settled at Boston, where he began to write comic stories and essays. A roving disposition carried him to the west, and he was engaged as local editor in Toledo, and later in Cleveland, Ohio, where his letters from "Artemus Ward, showman," a pretended exhibitor of wax figures and wild beasts, first attracted general attention. In 1860, he became a contributor to *Vanity Fair*, a New York comic weekly

paper; and, being invited to lecture, soon became very popular and attractive. As a lecturer, in 1863 he visited California, making the overland trip, visiting Salt Lake City, the Mormon capital, and drawing crowds in every town he visited. In 1864, he opened his illustrated lectures on California and Utah in New York, with immense success; and in 1866 was induced to visit England, where he became a contributor to *Punch*, and gave his lecture on the Mormons in the metropolis, at the Egyptian hall, Piccadilly. But while convulsing crowded audiences with laughter, he was wasting with pulmonary disease. Early in 1867, he went to Jersey for a milder air, but with no benefit; and was about to embark for America, when he died at Southampton, Mar. 6, 1867. He was tall, slender, with striking features, and a most amiable character, which attracted and attached to him many friends. By his will, after providing for his mother, leaving legacies to his friends, and his library to the best boy in the school of his native village, he left the bulk of his property in trust to Horace Greeley to provide an asylum for printers. His collected writings, which have had a wide circulation in America and England, are *Artemus Ward His Book*; *Artemus Ward among the Mormons: Artemus Ward among the Fenians*; and a posthumous collection and biography entitled *Artemus Ward in England*.

**BROWNE, EDWARD HAROLD, D.D.**, an English bishop, b. 1811; educated at Cambridge, and holding various professorships until in 1864 he was consecrated bishop of Ely; transferred to Winchester, 1873; resigned the office, owing to ill health, in 1890. He published *An Exposition of the Thirty-nine Articles*; *Aids to Faith*, etc. D. 1891.

**BROWNE, HABLOT KNIGHT, 1815-82**; an English caricaturist and book illustrator, well known under his pseudonym of "Phiz." He first came into prominence in 1835, when he succeeded Seymour as the illustrator of the *Pickwick Papers*; subsequently he illustrated a number of the novels of Dickens, Lever, Mayhew, and Ainsworth, besides contributing to comic serials, etc.

**BROWNE, ISAAC HAWKINS**, an English poet, 1705-80; educated at Cambridge; then engaging in the law. He was twice chosen to parliament; but his reputation rests exclusively upon his poems, such as *Design and Beauty*, and *The Pipe of Tobacco*, in which he imitates Cibber, Pope, Young, Swift, and others, all of whom were living when it was published. *De Anima Immortalitate*, a close imitation of Lucretius, was his most important work.

**BROWNE, JOHN ROSS, b. 1817**; an emigrant from Ireland to the United States when a child. He learned shorthand writing, and became a reporter in the United States senate. Having a desire to travel, he went first on a whale-ship, and on his return published a book of observations in Zanzibar. He next went on government business to California in 1849. Two years later he went as correspondent of a newspaper to Europe, traveling through Italy, Sicily, and Palestine, and giving an account in *Yusef*. After further service in the north-western territories and on the Pacific coast, he went to Algeria, Iceland, Poland, and Russia, and published *The Land of Thor*, and *An American Family in Germany*. In 1869, he published an elaborate report on the *Resources of the Pacific Slope*. He was minister to China for a short time, appointed in 1868, but recalled two years later. He died in 1875.

**BROWNE, Sir THOMAS**, antiquary and physician, was b. in London, 1605. His father, a merchant, left him an ample fortune, and he was educated at Winchester and Oxford. He began the study of medicine, then traveled over France and Italy, and after taking the degree of M.D. at Leyden, returned and settled (1636) at Norwich, where he continued to practice as a physician. He was knighted in 1671 by Charles II., and died 1683. His chief works are: *Religio Medici* (1642); *Inquiries into Vulgar and Common Errors* (1646); and a *Discourse on Sepulchral Urns* (1648). He wrote also *The Garden of Cyrus, or the Quincunial Loenge*; besides a variety of tracts, published after his death. His writings are highly prized by many for their genial fancy, pleasing quaintness of style, and varied erudition.

**BROWNE, WILLIAM**, an English poet, b. 1591, of whose life little is known, save that he was in Exeter college, Oxford, and was a tutor to an earl of Carnarvon. He was of the school of Spenser, and author of *Britannia's Pastorals*, and *The Shepherd's Pipe*. He d. about 1643.

**BROWNELL, HENRY HOWARD, 1820-72**; b. Rhode Island; educated at Trinity college, Hartford, and intended for the bar, but devoted himself to teaching and authorship. In 1847, he issued a volume of poems, after which came *The People's Handbook of Ancient and Modern History*; *The Discoverers, Pioneers, and Settlers of North and South America*, etc. Near the close of the civil war he was acting ensign on admiral Farragut's staff, and after the war accompanied the admiral to Europe. In 1866 he issued the volume *War Lyrics and other Poems*.

**BROWNELL, THOMAS CHURCH, D.D., LL.D., 1779-1865**; b. Mass.; graduated at Union college in 1804, where he was tutor and professor of chemistry and mineralogy. In 1810, he traveled in England and Ireland; and in 1816 was ordained a minister of the Protestant Episcopal church. In 1818 he was assistant minister of Trinity church in New York city, and in 1819 made bishop of Connecticut. It was under his care that Washington (now Trinity) college was founded, he being the first president. He was the author of *The Family Prayer Book*, and author and compiler of *Religion of the Heart and Life*.

**BROWNIAN MOVEMENTS.** The motion of non-living particles as seen through the microscope, often mistaken for motions of living matter. The cause of the movements has not been satisfactorily shown, but it has been surmised that heat is the motive power.

**BROWNIE**, a good-natured and invisible goblin in the old popular superstitions of Scotland, who attached himself to farm-houses and other country dwellings, and while the inmates were asleep performed their labors, churning, thrashing, etc., for them. In Cornwall, a similar *Brownie* was evoked to assist at the swarming of bees. The resemblance to the Robin Goodfellow (q.v.) of the English, and the Kobold of the Germans is conspicuous.

**BROWNING, ELIZABETH BARRETT**, one of England's most distinguished poets, was the eldest daughter of Edward Moulton, or Moulton-Barrett as he afterward wrote his name, and Mary Graham, and was born in Durham, March 6, 1806. Soon after, the family settled in Herefordshire. Elizabeth early displayed great precocity, eagerly read books beyond the comprehension of most children, and before she was eleven years of age, composed an "epic poem," *The Battle of Marathon*. Taking up the study of the classics in the original, she became intimately familiar with Greek literature, nor was she less acquainted with that of her own country and with philosophy and science. She began writing for literary periodicals in 1825, and in 1826 published anonymously *An Essay on Mind and other Poems*. In 1833 another anonymous volume appeared, *Prometheus Bound and Miscellaneous Poems*, giving evidence of unusual powers. After residing in Devonshire for a time, the family removed to London where Miss Barrett established her reputation by the publication of *The Seraphim and other Poems* (1838). The bursting of a blood-vessel in the lungs, added to the shock caused by the death in 1840 of a favorite brother, endangered her life, and for seven years she was confined to her room; but even here she resumed her labors and in 1844 published *Poems* including "The Cry of the Children," and "Lady Geraldine's Courtship" in which she praised Robert Browning's verse. Early in 1846 she met that distinguished poet and in Sept. they were married, against her father's wishes. Proceeding to Italy they made Florence their home, and there in 1849, a son was born, Robert Wiedemann Barrett, now known as an artist and poet. In 1850 a second edition of the *Poems* printed in 1844 came out, containing a new translation of the *Prometheus Bound* of Æschylus, and in 1851 *Aurora Leigh*, a semi-autobiographical poem. *Casa Guidi Windows* (1851) and *Poems before Congress* (1860) were inspired by her ardent sympathy with the movement to free Italy. By this time her health had begun to fail, and on June 30, 1861, she passed peacefully away. In 1862 Mr. Browning published a volume of verses by his wife, *Last Poems*; in 1868 her *Greek Christian Poets and the English Poets*; and in 1866 *Selections from the Poems of Elizabeth Barrett Browning* (2d series, 1880). The married life of these brilliant poets was singularly happy, and their mutual influence is clearly seen in their verse. Mrs. Browning was slight in figure, had brilliant eyes and an expressive face, was deeply spiritual, as all her writings show, was fascinating in conversation, and was erudite without being pedantic. Composing with great ease, she often employed false metres and fell into affectations, but it was well said of her that her diction was "at times sublime, and always musical and beautiful." The "Sonnets from the Portuguese," so called, written after her engagement to Mr. Browning, are unrivaled, of their kind, in the English language. See her *Letters to R. H. Horne*, edited by Mayer (1876); the *Life by Ingram* (Boston, 1888); Bayne's *Two Great Englishwomen*; and Sharp's *Life of Robert Browning* (1890).

**BROWNING, ROBERT**, one of England's most original and subtle poets, was born at Peckham, parish of Camberwell, a southern suburb of London, May 7, 1812, and was the son of Robert Browning a clerk in the Bank of England, and Sarianna Wiedemann, daughter of a shipowner at Dundee. The family was an ancient one, belonging to Dorsetshire, and according to the poet, the original name was De Bruni, while there is some reason for believing that the ancestral line comprised the Capt. Browning who commanded the ship which conveyed Henry V. to France before the battle of Agincourt, and Capt. Micaiah Browning who raised the siege of Derry in 1689 by springing the boom across Lough Foyle and perished in the act. Physically a typical Englishman, mentally Browning was the product of several races, his parental grandmother having been a West Indian Creole, his maternal grandmother, a Scotchwoman, and his great grandfather Wiedemann, a German from Hamburg. Mr. Browning, senior, who out of hatred for slavery, had sacrificed the sugar plantation at St. Kitts inherited from his mother, and had accepted the somewhat humble position of bank clerk, was a student of liberal education, an amateur poet and artist of more than average ability, and is described as having an extraordinary analytical faculty in elucidating complex criminal cases. Mrs. Browning, on her side, inherited from her father, who was an accomplished draughtsman and musician, intellectual and musical tastes, and was, withal, of an exalted and lovely character. In religious matters both the Brownings and Wiedemanns were Congregationalists. The future poet had a happy childhood, encouraged by his parents in his refined tastes and learning more from them than from the academy which he entered at the age of ten and where he remained four years. He had already at the age

of eight, read Pope's translation of Homer, and by the time he was twelve (1824) had written verses enough in a Byronic vein to form a volume. Fortunately, this failed to find a publisher, for in that same year the works of Shelley and Keats came into his hands and by revealing the possibilities of poetry, dissipated his youthful ideals and quickened his own development. After leaving the academy, Browning studied under a tutor, then attended a few lectures at University College, London, deciding to complete his education by travel on the continent and a more intimate acquaintance with foreign literature. His sympathetic father had left him free to choose his life work, and although he was at this time known as an artist and musician rather than a writer, evidently he had long felt a stronger drawing in the direction of authorship, and an early desire to produce a series of monodramatic epics illustrating the life of typical souls now revived itself urgently. Early in January, 1833, he put forth anonymously his first book, *Pauline*, written the year before; a poem showing the influence of Shelley, and immature as a whole, but abounding in passages of great beauty as John Stuart Mill and a few others were quick to acknowledge. In the autumn Browning went to Russia and from thence to Italy, returning in 1834 to Camberwell, where he began his *Paracelsus* (q.v.), a meta-physical drama, defending that brave but maligned scientist. This, published in 1835, was hailed by John Forster (q.v.) as a work of genius, and secured Browning the friendship of Macready the actor, for whom he wrote the historical drama *Stratford* (1837), which was successful but short-lived on the stage, owing to the financial condition of the theatre, and when revived in 1886 met with moderate success. From this time on until his marriage, Browning lived in London and its neighborhood, studying life, nature, and books, and at one time seriously thinking of combining literary work with the Independent ministry. In 1840 he published *Sordello*, the second in his series of dramatic monologues, but dating its inception back to 1834. This involved and, as it has been termed, wearisome but seductive poem, comprising 11,000 verses, and narrating the development of a typical poetic soul, was the favorite child of its author. The period 1841-46 was well filled by a series of pamphlets bearing the collective title *Bells and Pomegranates*, and beginning with *Pippa Passes*, a lyrical drama showing the power of unconscious influence, which received warm praise from Miss Barrett, afterwards Mrs. Browning. This remarkable group embraced the plays *King Victor and King Charles* (1842); *The Return of the Druses* (1843); *Colombe's Birthday* (1844), successfully acted in 1852; the tragedy *A Blot in the 'Scutcheon* (1843), produced at Drury Lane that same year; *Dramatic Lyrics* (1842), among them "Cavalier Tunes" and "In a Balcony"; *Dramatic Romances and Lyrics* (1845), including "How they brought the Good News," "A Lost Leader," and "The Flight of the Duchess," and closed with *A Soul's Tragedy* (1846). In 1846 Browning was married to Elizabeth Barrett, as related in the foregoing article, and after that date resided in Italy, spending with his wife some months in England and Paris, 1851-52, and in Normandy, 1858, and returning with his son to England after Mrs. Browning's death in 1861. Before this sad termination of an ideal married life, Mr. Browning had published (1850) *Christmas-Eve and Easter-Day*, a poem defending catholicity in religion; *Introductory Essay to Letters of Percy Bysshe Shelley* (1852); and *Men and Women* (1855), including "Evelyn Hope," "Fra Lippo Lippi," and other now well-known lyrics. Then followed *Dramatis Personæ*, containing, among other poems, "Gold Hair" and "Rabbi Ben Ezra"; *The Ring and the Book* (1868-69), an epic in 21,116 lines, dealing with the tyranny of the passions, and generally considered his masterpiece; *Balaustion's Adventure* (1871), including an English version of the *Alkestis* of Euripides; *Prince Hohenstiel-Schwangau* (1871), a defense by the prince (Napoleon III.) of the doctrine of expediency; *Fifine at the Fair* (1872), a powerful discussion of a question in morals; *Red Cotton Night-Cap Country* (1873), the story of a famous Norman law case; *Aristophanes' Apology* (1875), including a transcript from Euripides; *The Inn Album* (1875), a tragic story of betrayal and suicide; *Pachiarotto and other Poems* (1876), including "Hervé Riel"; *The Agamemnon of Æschylus* (1877); *La Saisiaz* and *The Two Poets of Croisic* (1878), the former asserting his belief in a future life; *Dramatic Idyls* (two vols., 1879-80); *Jocoseria* (1883), a number of narrative poems; *Ferishtah's Fancies* (1884), both Ferishtah and his stories being inventions; *Parleyings with Certain People* (1887), the characters serving as mouth-pieces for the poet's opinions on literary, artistic, and philosophical questions; *Asolando* (1889), poems on various subjects. The first complete edition of Browning's works (six vols.) was published in 1868.

From 1866 on, the poet lived in England, his sister Sarianna making her home with him, busying himself in many ways, but deeming no year complete without a trip to Italy or France. In 1867 he was elected an honorary fellow of Balliol College, Oxford, and also M.A. of the university, and at a late period received the honorary degree of LL.D. from Cambridge. In the autumn of 1889 he went to Venice to visit his son, and here a stealthily increasing affection of the heart culminated, and after a few days' illness he died quietly, on the 12th of December. His body, borne by a stately funeral procession of gondolas to the Isle of the Dead, was finally removed to England and interred, December 31st, with still more imposing ceremonies in the Poets' Corner in Westminster Abbey.

Browning was below the medium height, inclining to stoutness, with a ruddy complexion, large and bright gray eyes, fine features, a quickness of speech and gait, and a magnetic address which together with his liberal sympathy with humanity enabled him

to mingle freely with all classes. His love for Italy was as deep and intelligent as that of his wife, and like her he prized the society of Americans. He never lost his attachment for dissent, and was often a worshiper in churches of different non-conformist denominations. His religious faith was buoyant and unwavering and his optimism was in marked contrast to that of most of his literary contemporaries. Browning was one of the most erudite of poets, and those who rank him next to Shakespeare for his insight into the human mind declare that in the double capacity of poet and thinker he has had a powerful influence upon the spiritual and mental life of our age. Those who compare him with his friend and contemporary, Tennyson, grant that the former is more musical in versification and more artistic in style, but claim that Browning has more passion and more brilliancy and vigor of thought. Opposed to these are critics who, conceding Browning's eminence as a thinker, refuse to give him a high place among poets, insisting that he deliberately disobeyed the rules of his art by valuing substance above form, and that most of his subjects were essentially inartistic in their nature. The involved and inharmonic structure of much of Browning's verse, its supposed obscurity, its frequent pedantic digressions, forced rhymes, and affectations fatigue or repel the average reader, with whom he can never become popular; but he could write clearly and artistically, as many a splendid descriptive passage shows, and the fire, the pathos, and the music of many of his lyrics do not require a cultured mind to appreciate them. The "Browning Society" established in London in 1881 and the similar organizations formed throughout England and her colonies and the United States, have by their discussions and publications done much to increase the poet's popularity. See the *Browning Society Papers*; Furnivall's *Browning Bibliography*; Mrs. Sutherland Orr's *Handbook to the Works of Robert Browning* (1885); minor works by Symons and by Fotheringham (1887); the *Life*, with bibliography by Sharp (1890); and that by Mrs. Sutherland Orr (3 vols. 1891).

**BROWNISTS**, a name current in England toward the end of the sixteenth century and applied indiscriminately to all seceders from the established church, among whom Robert Browne, or Brown (q.v.), was especially prominent. His writings (1582-88) were widely read and did much to foster those principles upon which the Separatist churches of England and Holland and the later Independent and Congregational churches of England and America were founded, but the extreme independency he advocated together with his illiberality was so distasteful, and his return to the church of England was regarded as such a disgraceful relapse, that, in general, the Separatists repudiated the appellation "Brownists" as inappropriate and slanderous.

**BROWNLOW**, WILLIAM GANNAWAY, 1805-77; b. Va. He was bred to the carpenter's trade, but in 1826 became a Methodist minister, and was for 10 years an itinerant. He took part in politics, advocating the election of Adams in 1828. In 1837, he was editor of the *Knoxville Whig*, and his bold and quaint utterances soon gave him a wide reputation. In 1856, he defended the Methodist church in a work called *The Iron Wheel Examined and its Spokes Extracted*. Two years later, with Rev. A. Pryne of New York, he discussed the question, "Ought American Slavery to be Perpetuated?" Brownlow defended slavery. In the secession he clung to the union as the best means of upholding the institutions of the south. For this he was arrested by the confederate government and sent out of their lines. He returned to Tennessee in 1864, and the next year was elected governor, and in 1869 was sent to the United States senate. He was ardent, fearless, and resolute, caring little for refinement in speech or action. He was popularly known as "Parson Brownlow," and as the "fighting parson."

**BROWN PIGMENTS**, a term in art applied to those substances in which the three primary colors unite in unequal proportions, red being in excess. B. P. are chiefly mineral, and are used sometimes in a raw but usually in a burned state. The most important are bister, asphaltum, umber, terra di sienna, Mars brown, Cassel earth, and brown madder. According to the pigment, the character of the color is a yellow-brown, red-brown, purple-brown, etc. See **DYEING**.

**BROWN-SÉQUARD**, CHARLES EDWARD, a French-American physiologist born in Mauritius, 1818. His father, Edward Brown, was a native of Philadelphia; his mother was French, of the name of Séquard. He took the degree of M.D. at Paris, 1846, and afterwards spent much of his time in America, investigating and lecturing. His researches have been extensive, furnishing many of the most important facts in physiology, particularly in regard to the nervous system. It was formerly supposed that Longet had shown that the posterior columns of the spinal cord conducted sensation to the brain, while the anterior columns transmitted motor impulses to the muscles. Bolingeri, however, in 1823, claimed to have demonstrated that sensation was conveyed to the brain by the gray substance of the cord only. These observations have been confirmed by Brown-Séquard, who was also the first to demonstrate that the decussation of the sensory conductors is in the cord itself; and he has the reputation of having created the physiology of the sensory tract of the spinal cord. His experiments upon the transfusion of blood are also of great interest. Detached muscular parts of animals, after losing their irritability, were revived for a considerable time by injecting fresh, oxygenated blood into them. A remarkable experiment was the transfusion, into the carotid artery of a dog just dead from peritonitis, of blood from a living dog. The dead dog was sufficiently restored to be able to stand upon his feet and wag his tail, and make other motions. He died a second time, twelve and a half hours after. Insufflation was also employed. In



1864 Dr. Brown-Séguard was appointed professor of physiology and pathology of the nervous system, in Harvard university. Returning to France in 1869, he was appointed professor of experimental and comparative physiology at Paris. He was founder and editor of the *Journal de la Physiologie de l'Homme et des Animaux* from 1858 to 1868. He established *Archives de la Physiologie Normale et Pathologique* in 1869. In 1878 he practiced medicine in New York, and with Dr. E. C. Seguin published the *Archives of Scientific and Practical Medicine*. In 1878 he succeeded Claude Bernard as prof. of experimental medicine at the collège de France. He published *Lectures on the Diagnosis and Treatment of the Principal Forms of Paralysis of the Lower Extremities*, 8vo, London, 1861. In 1889, after a series of successful experiments upon himself, he advocated the use of vitalizing fluids in the bodies of animals as a means of prolonging and invigorating human life. He died April 2, 1894.

**BROWNSON**, ORESTES AUGUSTUS, LL.D., 1803-76; b. Vermont; a theologian and author. He was at first a Presbyterian, but soon became a Universalist preacher, and was an indefatigable writer in support of whatever he for the time adopted. In 1823, he went into politics and tried to establish a workingmen's party in New York, moved thereto by the ideas of Robert Owen. In 1832, he was enthusiastic over Dr. Channing, and became a Unitarian preacher; in 1836, he organized in Boston "The Society of Christian Progress," as a church of which he was pastor. About this time he published *New Views of Christianity, Society, and the Church*, which was a moderate attack on Protestantism. In 1838, he started the *Boston Quarterly Review*, which had existence for about five years, and was then merged in the *New York Democratic Review*. In 1840, he published *Charles Elwood, or the Infidel Converted*, a treatise in the form of a story, in favor of the Roman Catholic church, towards which the author was drifting, and which he joined in 1844. His *Works* were published in 19 vols. (New York, 1883-5).

**BROWN SPAR**, a name often given by mineralogists to certain varieties of dolomite (q. v.), or magnesia limestone, of not unfrequent occurrence, distinguished by a brownish or reddish color, and a pearly luster, upon account of which they are also sometimes called *pearl spar*.

**BROWN'S TRACT**, a tract of land, containing 210,000 acres, in the Adirondack mountain region in n. N. Y., extending across Herkimer co., and into Hamilton on the e. and Lewis on the w. It was purchased by Mr. N. Brown, the patron of Brown univ., R. I., from Alexander McComb, who had bought from the state abt. 4,000,000 acres at 8d. per acre, with the result of financial ruin to himself. The tract is magnificently wooded.

**BROWNSVILLE**, a borough in Fayette co., Penn., 55 m. s. of Pittsburg; pop. '90, 1417. The borough is on the Monongahela river, over which there is a large and expensive bridge, and is principally engaged in coal mining and manufacturing.

**BROWNSVILLE**, city and co. seat of Haywood co., Tenn., on the Louisville and Nashville railroad, 57 m. n.e. of Memphis; pop. '90, 2516. Brownsville is in a rich cotton district, and has a good trade; has also Wesleyan Female College, Brownsville Female College (Bapt.), and weekly newspapers.

**BROWNSVILLE**, a city, port of entry and co. seat of Cameron co., Texas; on the Rio Grande, and the Rio Grande railroad; opposite Matamoras, Mexico, with which it has a large trade. It has a Roman Catholic cathedral, a Convent of the Incarnate Word, churches of other denominations, private and public schools, newspapers, a federal building, and important commercial and stock raising interests. Fort Brown, a garrisoned United States post, is near by. Pop. '90, 6134.

**BROWN UNIVERSITY**, at Providence, R. I., founded in 1764, is the seventh American college in order of date. Its origin is due to the desire of the Philadelphia Baptist Association to secure for the ministry of the denomination an education free from the restrictive influences prevailing at the existing colonial colleges.

In 1762 the Rev. Morgan Edwards was chosen to take the preliminary steps, and in 1763 the Rev. James Manning was sent to Newport to obtain support for the college. Rhode Island was selected not only on account of the numbers and influence of the Baptists among its population, but especially because it offered absolute religious freedom. Here, after some difficulties, a charter was obtained in 1764. Its principal provisions are: that no religious tests shall ever be allowed for admission of applicants; all sectarian teachings forever excluded from the college course; equal privileges for all Protestant denominations; professors chosen without regard to denominational views; the president always to be a Baptist; the government to be by a Board of Fellows consisting of twelve members, eight of whom, including the president, are to be Baptists, and by a Board of Trustees, of thirty-six members, of whom twenty-two must be Baptists; five, Quakers; four, Congregationalists; and five, Episcopalians. Within recent years an Advisory Committee composed of the secretaries of the various alumni associations has been instituted. In April 1764, Mr. Manning settled in Warren, and opened a Latin school, preparatory to a beginning of college instruction, and, the next year, was appointed president. He was not only a graduate of Princeton, but a young man of superior ability, and the school soon became a flourishing affair. In 1767 Mr. Edwards went to England to solicit aid for the college, and, as he said, "considering the feeling on account of the stamp act," was very successful. In 1769, the first class, consisting of seven young men, was graduated. The commencement exercises awakened anew the

interest felt in the college, and the contest as to its permanent location was finally settled by the proposition that it should go to the county raising the most money. Providence raised over \$20,000, and in 1770 the school removed there. That spring the foundations of the first college building, University Hall, were laid on the crest of a hill overlooking the town, bay, and surrounding country. The plot consisted of eight acres originally owned by Chad. Brown, associate and friend of Roger Williams. The preparatory school was also transferred to Providence, and under the name of the University Grammar School still continues as an auxiliary of the college. College instruction was suspended from 1776 to 1782 on account of the war, and the building was occupied by troops. In 1804 the name of the institution was changed from Rhode Island College to Brown University, in honor of Nicholas Brown, of the class of 1786, whose benefactions in all amounted to \$200,000.

The academic year consists of three terms with two recesses. It begins on the third Wednesday in September and ends on the third Wednesday in June, and covers about thirty-six weeks. The courses of instruction form a system of required and elective study. The studies of the freshman year are nearly all required. Since 1894, candidates for the degrees of Bachelor of Arts and Bachelor of Philosophy have been allowed large liberty in the choice of studies. Candidates for the degree of Bachelor of Science are allowed less freedom of election, in order that they may thoroughly master the branches necessary to a proper equipment in science, while to candidates for the strictly professional degrees of Civil Engineer and Mechanical Engineer no option is allowed. The elective studies, which are very numerous, are so placed in the curriculum as to give all the freedom of choice which the necessary limitations of the schedule of lectures allow. This schedule provides a number of parallel courses, each unitary and progressive and extending through the last three years. Every student is advised to adopt, in the main, one of these courses. The income of about one hundred scholarships is available for needy but deserving students. There is also an aid fund, the income of which may be employed as a gift or a loan.

The libraries number 90,000 volumes besides 20,000 pamphlets. They include the main library and the various department libraries, of which the most important are the Harkness Classical Seminary Library, the Romance Seminary Library, the Chemical Department Library, the Bancroft English Library, and the Conant German Seminary Library, the last containing over 6,500 choice volumes. In the main library is included the Harris Collection of American Poetry, numbering 6,000 volumes. The library fund amounts to \$57,000, including three special funds for works on History and Botany. The Jenks Museum of Zoology, the Museum of Anthropology, the Olney Herbarium, and the Museum of Classical Archaeology are all well equipped with illustrative material for the work of the departments represented. An important collection of historical portraits is exhibited in Sayles Hall. The Ladd Astronomical Observatory is furnished with a 12-inch equatorial and necessary minor apparatus. The Physical Laboratory occupies a new and costly building of its own. The Anatomical, Chemical, Botanical, Psychological and Mechanical Engineering Departments all have important laboratories. The Gymnasium is of recent construction and well equipped. Exercise is required of all students. The buildings are fifteen in number, ranging in date from 1770 to 1897. The endowments amount to \$1,100,000.

The Women's College was founded in 1892. All instruction is given by the University faculty, and all examinations, degrees, and graduate courses are open to women. The present number of woman students is 157. The total number of students in the University in 1897 is 908. The total number of graduates is 4,646, of whom 2,174 are living. The officers of instruction number 80.

The presidents have been: James Manning, 1764-91; Jonathan Maxcy, 1792-1802; Asa Messer, 1802-26; Francis Wayland, 1827-55; Barnas Sears, 1856-67; Alexis Caswell, 1868-72; E. G. Robinson, 1872-89; E. B. Andrews, 1889-97. See *Manning and Brown University*, 1864; and *History of Brown University*, 1897, by R. A. Guild; also *History of Higher Education in R. I.*, 1894, by W. H. Tolman.

**BRUCE**, BLANCHE K., born in slavery in Prince Edward co., Va., in 1841; was educated in his master's house; taught school in Mo.; studied at Oberlin college and privately; removed to Mississippi, and in 1869 became a planter; served as sheriff of Bolivar co. 1871-74; was co. supt. education 1872-73; U. S. Senator 1875-81; register of U. S. treasury 1881-85; and was appointed recorder of deeds in the District of Columbia in 1890. D. March, 1898.

**BRUCE**, the surname of a family illustrious in Scottish history, descended from Robert de Bruis, a Norman knight, who accompanied William the Conqueror to England in 1066, and died soon after. His younger son, Adam, who acquired large possessions in Yorkshire, left a son, Robert de Brus of Cleveland, a companion in arms of prince David of Scotland, afterwards David I., from whom he received a grant of the lordship of Annandale, held by the tenure of military service. At the commencement of the war in England between Stephen and Matilda, niece of the king of Scots, Robert de B. adhered to the former, and renounced his allegiance to David, resigning his lands in Annandale to his son Robert. In 1138, he was sent by the barons of the north of England to negotiate with David, who had advanced in support of his niece's claims as far as Northallerton, Yorkshire. In the battle of the Standard which followed, he took prisoner his son Robert, then 14 years of age, who, as lord of Annandale, fought on the Scottish side. He died in 1141. His English estates were inherited by his eldest son, Adam, whose male line terminated in Peter de B. of Skelton, constable of Scarborough castle in 1271. Robert de B., 2d lord of Annandale, had two sons: Robert—who married a natural

daughter of William the Lion, and died, without issue, before 1191—and William, whose son, Robert, 4th lord of Annandale, married Isobel, 2d daughter of David, earl of Huntingdon and Chester, brother of William the Lion, and thus laid the foundation of the royal house of Bruce. He died in 1245.

**BRUCE, DAVID**, son of king Robert Bruce, succeeded his father, in 1329, as David II., when only 5 years old. In terms of the treaty of Northampton, he had married, when 4 years old, Joanna, daughter of Edward II. of England, and on 14th Nov., 1331, he was crowned with her at Scone. In 1333, the success of Edward Baliol and the English party obliged David's guardians to send him and his consort to France; but on the dispersion of Baliol's adherents, David returned to Scotland in 1341. He made three unsuccessful inroads into England, and on a fourth invasion, in 1346, was taken prisoner at the battle of Neville's Cross, near Durham, and conveyed to the tower of London. Thence he was removed to Odiham, in Hampshire, and not released till 1357, when his ransom was fixed at 100,000 marks. His queen dying in 1362, he married Margaret Logie, a Scottish gentlewoman of singular beauty, whom he divorced in 1370. He had no issue; and in his latter years, he was engaged in several intrigues with England, with the view of excluding his nephew, Robert, the steward of Scotland, the next heir, from the throne. He died at Edinburgh castle, Feb. 22, 1371.

**BRUCE, EDWARD**, king of Ireland, uncle to the above, a chivalrous but rash and impetuous prince, was actively engaged in the struggle for Scotland's independence; and in 1308, after defeating the English twice, made himself master of Galloway. In 1315, the chieftains of Ulster tendered to him the crown of Ireland, on condition of his assisting them to expel the English from the island. With a small army of 6000 men, he embarked at Ayr, and reached Carrickfergus, May 25th of that year, accompanied by sir Thomas Randolph, earl of Moray, sir John of Soules, sir John the Stewart, sir Fergus of Ardrossan, and other Scottish knights of renown. His rapid victories soon made him master of the province of Ulster, and he was crowned king of Ireland, May 2, 1316, but was slain at the battle of Dundalk, in 1318.

**BRUCE, GEORGE**, 1781–1866; b. Scotland, went to Philadelphia in 1795 as a printer, and in 1808 became publisher of the *New York Advertiser*. In 1812, he and his brother introduced the art of stereotyping, and followed that and type-founding thereafter. One of the nephews was the inventor of a machine for casting types.

**BRUCE, JAMES**, a celebrated traveler, born at Kinnaird house, Stirlingshire, Dec. 14, 1730, was the eldest son of David Bruce, esq., of Kinnaird, and Marion Graham of Airth. Educated at Harrow, he was sent, in the winter of 1747, to the university of Edinburgh, with the intention of studying law; but changing his views, he went to London, and having, in Feb., 1754, married the daughter of a wine-merchant's widow, became a partner in the business. His wife dying within a year, he made a tour on the continent, and on his father's death in 1758, he succeeded to the estate of Kinnaird. In 1761, he retired from the wine-trade, and in 1763 was appointed consul-general at Algiers. He remained there about two years, studying the oriental languages, and acquiring the rudiments of surgery. He then went to Aleppo, where he took further instructions in the medical art, being resolved to travel in the character of a physician. In June, 1768, he proceeded to Alexandria and from Cairo set out on his famous journey to Abyssinia, which forms an epoch in the annals of discovery. Sailing up the Nile to Syene, he crossed the desert to Cosseir, and arrived at Jeddah in April, 1769. After various detentions he reached Gondar, the capital of Abyssinia, in Feb., 1770; and on Nov. 14 of that year, succeeded in reaching the sources of the Abawi, then considered the main stream of the Nile. This accomplishment of the chief object of his journey filled him with the greatest exultation. He remained about two years in Abyssinia, and returning by way of Sennaar and the desert of Assouan, after great hardship reached Alexandria, whence he embarked, Mar., 1773, for Marseilles. In France he spent a considerable time, visiting the celebrated count de Buffon, and other distinguished men, and in 1774, he returned to Scotland. In 1776, he married Mary, daughter of Thomas Dundas, esq., of Fingask, by whom he had two sons and one daughter. His long-expected *Travels to Discover the Sources of the Nile, in the Years 1768–73*, were published in 1790, in 5 large 4to vols. with plates and charts. The work contained such curious accounts of the manners and habits of the people of Abyssinia, that it startled the belief of many, and some of them were set down as fabrications. Among other doubters were De Tott in France, and Dr. Johnson in England. Modern travelers, including Salt, Pearce, Burckhardt, Beizoni, and others, have, however, fully confirmed his statements. B. died April 27, 1794, at Kinnaird, of a fall down stairs.

**BRUCE, MICHAEL**, a minor Scottish poet, the son of a weaver, b. at Kinnesswood, Kinross-shire, Scotland, Mar. 27, 1746, was, in his younger years, employed as a herdbooy. In 1762, he was sent to Edinburgh University to study for the ministry, and when not at college, was engaged as a village schoolmaster. He had all his life to struggle with poverty, and his frame being weak, melancholy took possession of his mind, and his constitution began visibly to decline. He died of consumption, July 6, 1767, aged 21. His poems, few in number, and of a tender and pathetic description, were published by the Rev. John Logan, his fellow-student and associate at college, at Edinburgh in 1770. His last composition was a touching elegy on his own approaching death.

**BRUCE, ROBERT**, the most heroic of the Scottish kings, was b. Mar. 21, 1274. In his youth he favored the English interests, in the expectation, doubtless, of his father being preferred to the Scottish throne. In 1296, as earl of Carrick, he swore fealty to Edward I. at Berwick, and the following year he renewed his oath of homage at Carlisle. Shortly after, he abandoned the cause of Edward, and, with his Carrick vassals, joined the Scottish leaders in arms for the independence of their country. On the defeat of the Scots, a few months afterwards, at Irvine, B. made his peace with the English monarch. After Wallace's defeat at Falkirk, B. burned the castle of Ayr to the ground, to prevent its falling into the hands of the English, and retired into the recesses of Carrick. In 1299, the year after Wallace had resigned the regency, B., then in his 25th year, was admitted one of the four regents, who ruled the kingdom in the name of Baliol. In the three campaigns which subsequently took place, previous to the final subjugation of Scotland, B. continued faithful to Edward, and in 1305 was consulted in the settlement of the government. With John Comyn, called the Red Comyn, the nephew of Baliol, he appears to have entered into some agreement as to their rival claims to the throne. In an interview between them, in the church of the Minorite Friars, Dumfries, Feb. 4, 1305-06, a quarrel took place, and B., in a paroxysm of passion, stabbed Comyn with his dagger. Rushing out to his attendants, he exclaimed: "I doubt I have slain the Red Comyn." "You doubt!" cried one of them; "I mak sikker!" (i.e., sure), and, running into the church with some others, slew Comyn and his brother, who attempted to defend him. B. hastened to Lochmaben castle, assembled his vassals, and asserted his right to the throne. Two months after (Mar. 27), he was crowned king at Scone. An English army, under the earl of Pembroke, nominated by Edward governor of Scotland, took possession of Perth, and on the night of the 18th June, attacked B. in the wood of Methven, compelling him to retreat into the wilds of Athole. At Dalry, near the head of Loch Tay, B. was attacked by Alexander, lord of Lorn, chief of the Macdougals, husband of the aunt of the Red Comyn, and compelled to retire. Sending his queen and her ladies to Kildrummie castle, Aberdeenshire, under the charge of Nigel Bruce and the earl of Athole, he, with 200 followers, crossed Loch Lomond, and had recourse for subsistence to the chase. B. next took refuge in the little island of Rathlin, on the n. coast of Ireland, where he remained all winter, and was supposed to be dead. In his absence, the English took the castle of Kildrummie, hanged Nigel Bruce and other chiefs who had defended it, and tore the queen and princess Marjory from the sanctuary of St. Duthac, Ross-shire. All B.'s estates were confiscated, and himself and adherents excommunicated by the pope's legate at Carlisle. In the spring of 1307, with about 800 men, B. landed in Carrick, and at midnight surprised the English garrison in his own castle of Turnberry; but before a superior force he retired into the mountainous districts of Ayrshire. At Loudon hill, May 10, 1307, he defeated the English under the earl of Pembroke, and, three days after, overthrew another party under the earl of Gloucester. In less than two years he wrested from the English nearly the whole of Scotland. His authority being now established, in 1309 B. advanced to Durham, laying waste the country. The same year, Edward II. of England invaded Scotland, but was compelled to retreat from Edinburgh to Berwick-upon-Tweed. In the harvest of 1312, the Scots again invaded England, but unsuccessfully. B. now reduced the Isle of Man also. On his return, in the autumn of 1313, he found his brother, Edward Bruce, engaged in the siege of Stirling castle, held by sir Philip Mowbray for the English. A treaty was entered into, by which Mowbray bound himself to surrender it, if not relieved before 24th June following. This led to the memorable battle of Bannockburn, 24th June, 1314, at which B. commanded in person. The English, under Edward II., amounting, it is said, to about 100,000 men, were totally routed, leaving 30,000 dead upon the field; while the Scots, numbering only 30,000, and 15,000 camp-followers, lost about 5000. In 1317, B. passed over to Ireland, to assist his brother, Edward, elected king of that country, and defeated the Anglo-Irish under the baron of Clare; and in the spring of 1318 the Scots army invaded England by Northumberland. Another invasion of Scotland by the English king, who was compelled to retreat, was followed by B. again marching into England. After besieging Norham castle, he defeated Edward once more at Biland abbey, Yorkshire. A truce was, in consequence, ratified between the two kingdoms at Berwick, June 7, 1323, to last for 13 years. On the accession of Edward III., in 1327, hostilities recommenced; and the Scots being again victorious, a final treaty was ratified in a parliament at Northampton, Mar. 4, 1328, recognizing the independence of Scotland, and B.'s right to the throne. His warfare was now accomplished, and, suffering under the disease of leprosy, he spent the last two years of his life at Cardross castle, on the northern shore of the firth of Clyde. He died June 7, 1329, in his 55th year, and the 23d of his reign. His heart, extracted and embalmed, was delivered to sir James Douglas, to be carried to Palestine and buried in Jerusalem. Douglas was killed fighting against the Moors in Spain, and the sacred relic of B., with the body of its devoted champion, was brought to Scotland, and buried in the monastery of Melrose. B.'s body was interred in the abbey church of Dunfermline; and, in clearing the foundations for a third church on the same spot in 1818, his bones were discovered. He was twice married: (1) to Isabella, daughter of Donald, tenth Earl of Mar—issue, a daughter, Marjory, wife of Walter the high steward, whose son ascended the throne as Robert II.; and (2) to Elizabeth, daugh-

ter of Aymer de Burgh, earl of Ulster—issue, one son, who succeeded him as David II, and two daughters.

**BRUCE, ROBERT DE**, fifth lord of Annandale, son of the fourth lord above mentioned, and the competitor with John Baliol for the crown of Scotland, was b. in 1210. On the death of his mother, the princess Isobel, in 1252, he did homage to Henry III. for her lands in England, and in 1255 was made sheriff of Cumberland, and constable of the castle of Carlisle. About the same time he was appointed one of the fifteen regents of Scotland, in the minority of Alexander III. In 1264, he led, with Comyn and Baliol, the Scottish auxiliaries to the assistance of the English monarch at the battle of Lewes, where he was taken prisoner, but released after the battle of Evesham, the following year. On the Scottish throne becoming vacant at the death, in 1290, of Margaret, the "maiden of Norway," granddaughter of Alexander III., Baliol and Bruce claimed the succession, the former as great-grandson of David, earl of Huntingdon, by his eldest daughter, Margaret; the latter as grandson, by his second daughter, Isobel. Edward I. of England, to whom the dispute was referred, decided in favor of Baliol, 19th Nov., 1292. To avoid swearing fealty to his successful rival, B. resigned Annandale to his eldest son, Robert de B., earl of Carrick. He died at his castle of Lochmaben, Dumfriesshire, in 1295, leaving three sons and a daughter.

**BRUGIA**, a genus of shrubs somewhat doubtfully referred to one of the allied natural orders *rutacea* (q. v.), *simarubacea* (q. v.), and *xanthoxylacea* (see *XANTHOXYLUM*).—*B. anti-dysenterica*, or *ferruginea*, is an Abyssinian species, the leaves of which are said to be tonic, astringent, and useful in dysentery. Those of *B. Sumatrana*, a native of the Indian archipelago, China, etc., possess the same medicinal properties. They are intensely bitter.—The Abyssinian species acquired a factitious importance in the beginning of the 19th c., from a mistaken belief that it produced the dangerous false Angostura bark (see *ANGOSTURA BARK*), and in this belief the name *brucine* (q. v.) was given to an alkaloid really produced by the *nux vomica* (q. v.) and other species of *strychnos* (q. v.).

**BRUCH, MAX**, b. Cologne, 1838; at an early age showed remarkable talents for musical composition; held the Mozart scholarship, 1853-57; and in 1863 brought out the opera of *Lorelei*, on Gelbel's libretto, written for and partly set by Mendelssohn. In 1865 he was made musical director of the Concert-Institution in Coblenz, and in 1867 became kapellmeister to the prince of Schwarzburg-Sonderhausen. In 1870 he went to Berlin, and has since lived there and at Bonn. He visited the United States in 1883, and conducted his oratorio, *Arminius* in Boston. Max Bruch ranks among the first musicians of Germany as the representative of the epic cantata. His works include orchestral and chamber-music; the operas *Jungfrau von Orleans*, Cologne, 1859; and *Hermione*, Berlin, 1872; *Römischer Triumphgesang*, for male chorus and orchestra, op. 19; the cantatas *Frithjof*, *Salamis*, *Normanneneug*, *Die Flucht der heiligen Familie*, op. 20; *Schön Ellen*, op. 24; *Odysseus*, op. 41; *Das Lied von der Glocke* (Schiller's poem), op. 45; and *Achilleus*, op. 50. The *Scenes from the Frithjof Saga* are the best known of his orchestral works.

**BRUCHSAL**, a t. of the grand duchy of Baden, situated on the Salzbach, and on the railway between Heidelberg and Carlsruhe, 12 m. n.e. of the latter place. B., which is a place of considerable antiquity, has three suburbs. The old castle of the prince-bishops of Speier, who took up their residence here early in the 11th c., is still standing, and in the church of St. Peter are some ancient tombs. B. has a penitentiary organized on a modified form of the Pennsylvania system. It is an important railway centre. Pop. '90, 11,902.

**BRUCINE** is one of the alkaloids (q. v.) present in *strychnos nux vomica* along with strychnine, etc. It is not so abundant as the strychnine, nor is it so poisonous. It is mainly characterized by giving a blood-red color with concentrated commercial nitric acid, and, indeed, the red color always yielded by *nux vomica*, and occasionally by strychnine when treated with nitric acid, is due to the presence of brucine.

**BRUCITE**, a native magnesian hydrate, found in serpentine in New Jersey, and in the chrome mines in Texas. Syn.  $MgH_2O_2$ .

**BRÜCKENAU**, a village of Bavaria, on the Sinn, 86 m. n.e. of Würzburg. It is famous in connection with the baths of B., which are picturesquely situated in a beautiful part of the valley of the Sinn, about 2 m. w. from the village. The grounds are tastefully laid out in gardens, and charming walks traverse the surrounding woods. The place is a favorite summer-resort of the Bavarian court. B. has paper-mills. Pop. 2000.

**BRUCKER, JOHANN JAKOB**, a German theologian and historian, 1696-1770. He was educated at Jena, where he took the degree of A. M. in 1718, and devoted himself to the study of the history of philosophy. In 1723 came *Historia philosophica doctrinae de ideis*, and in 1731 he was chosen a member of the Berlin academy of sciences. Thence he went to Augsburg as pastor of the church of St. Ulrich, where he published dissertations on the history of philosophy, and still later a history of philosophy in dialogue form. In 1741 came the first volume of his great work on the critical history of philo-

sophy, completed in 1744, a work that had an immense success. He wrote many other works on philosophical subjects, and superintended and corrected an edition of Luther's translation of the New Testament, but did not live to complete it.

**BRUGES** (Ger. *Brügge*), a city of Belgium, capital of the province of West Flanders, is situated in a fertile plain about 8 m. from the sea, with which it is connected by the three canals from Ghent, L'Ecluse, and Ostend, the latter admitting the largest sea-going ships. Lat.  $51^{\circ} 12' \text{ n.}$ , long.  $3^{\circ} 14' \text{ e.}$  B. derives its name from its many bridges, all opening in the middle to admit of the passage of vessels. The ramparts surrounding the city are an agreeable promenade. The streets have a venerable and picturesque appearance, but they no longer present the scene of activity which characterized the city in the later Middle Ages, when it was one of the trading posts of the Hanseatic League. Among the most interesting buildings are the town-hall, with a lofty tower and a celebrated set of 48 bells; a Gothic senate-house, built about the close of the 14th c.; a court of justice, containing a famous carved chimney-piece of the date 1559; the church of Notre Dame, with its spire 450 ft. high, its many valuable paintings, and a statue of the Virgin (said to be by Michael Angelo), for which Horace Walpole offered 30,000 florins, and its splendid monuments of Charles the Bold and his daughter Mary, wife of the emperor Maximilian; the cathedral of St. Sauveur, not remarkable for its exterior, but containing paintings by eminent masters; St. John's hospital, with celebrated pictures by Memling, etc. The academy of painting contains several fine pictures by J. van Eyck. B. is still an important commercial port, and has various manufactures and shipbuilding yards. Railways connect B. with Ostend, Ghent, and other cities of Belgium and the continent. Its population in 1894 was 49,842. B. is a very ancient city. Here, it is said, St. Chrysostom preached the gospel as early as the 3d century. In the 7th c., B. was the capital of the surrounding district called Flanders, and before the conquest of England by the Normans its commercial importance was established. In the beginning of the 13th c., it was the central mart of the Hanseatic league; and in the following century it may be said to have become the metropolis of the world's commerce. Commercial agents from 17 different kingdoms resided here, and no less than 20 ministers from foreign courts had mansions within its walls. Its population at this time amounted to upwards of 200,000. In 1488, the citizens rose in insurrection against the archduke Maximilian, and with the harsh measures of repression which ensued, commenced the commercial decline of Bruges. Many of the traders and manufacturers, driven forth from their own country, settled in England, and from this time may be dated the beginning of English manufacturing superiority. In the 16th c., however, the tapestry of B. was still celebrated throughout Europe, and the famous Gobelin tapestry of Paris is said to owe its origin to a manufacturer of Bruges. The city was taken by the French in 1794, and soon after incorporated with the French empire; but in 1815 it became a part of the kingdom of the United Netherlands, and in 1830 of the Belgian monarchy.

**BRUGG**, or **BRUCK**, a village of Switzerland, in the canton of Aargau, on the right bank of the Aar, and near the mouth of the Reuss, about 9 m. n.e. of Aarau. It is interesting as the birthplace of many theologians, being known as the "Prophets' Town" during the Reformation; and also as the cradle of the house of Hapsburg, to whom, in early times, it belonged. Pop. about 2000.

**BRUGMANN, KARL**, was born in Wiesbaden, in 1840, studied at Halle, Leipzig, and Bonn; from 1872-77 he was instructor in the gymnasium, and in 1877 entered Leipzig university in the department of Sanscrit and comparative philology. Here he was appointed professor in 1882; was called to Freiburg in 1884, and in 1887 returned to Leipzig. With Osthoff (of Heidelberg), Brugmann is the most active representative of the so-called *junggrammatischen* movement, which, as well as physiology of sound, must be regarded as the result of physical factors; since, according to Brugmann's and Osthoff's view, these affect all sound-waves and acoustics, as well as all so-called formations by analogy. Moreover, this new movement accords with the following laws of Leskien: (1) all sound-changes, produced mechanically, develop according to laws without exceptions; (2) new language formation by analogy, as it plays an important part in the life of modern languages, must be recognized and expected in earlier as well as the earliest periods. On these principles rest Brugmann's *Morphologischen Untersuchungen auf dem Gebiet der indogermanischen Sprachen*, published in connection with Osthoff. Among Brugmann's works on special subjects are: *Vergleichende Grammatik der indogermanischen Sprachen*, and also a number of articles which he contributed to Curtius' *Studien zur griechischen und lateinischen Grammatik*.

He has also written a work on the text criticism of Homer (1876); on the popular songs and stories of the Prussian and Russian Lithuanians (1885). His great treatise on the comparative grammar of the Indo-Germanic languages has been translated into English, the first volume appearing in 1888. The discoveries and deductions of Brugmann, Ascoli, Verner, and Osthoff have wrought a complete revolution in the science of comparative philology, more especially in the views held concerning the vocalization of the original tongue. He also became one of the editors of the *Indogermanische Forschungen*.

**BRUGMANS, SEBALDUS JUSTINUS**, 1763-1819; a Dutch naturalist and physician, professor of philosophy and physical sciences at Franeker, Holland, where he founded a museum of comparative anatomy. He organized and became chief director of the

sanitary institutions of Holland. He improved the condition of military hospitals, and by his effort the 20,000 soldiers wounded at Waterloo were properly cared for.

**BRUGSCH, HEINRICH KARL, PH.D.**, b. 1827; a German Egyptologist, and director of the Egyptian museum in Berlin. He made two visits to Egypt for archaeological purposes, and was a member of the Prussian embassy to Persia in 1860. In 1864, he founded at Leipzig a periodical devoted to Egyptian archaeology. At Göttingen he was professor in 1868-70, when he became director of an Egyptological school at Cairo. He received the titles of Bey and of Pasha, and in 1881 succeeded M. Mariette as keeper of the Egyptian collections at Boulak. His principal works are *Egyptian Monuments*, 1862-66; *History of Egypt from the Earliest Times to the Present Day*, vol. I., 1859; *A Dictionary of Hieroglyphics*, 1867-68; *The Exodus and the Egyptian Monuments*, 1876, etc. He died Sept. 10, 1894.

**BRÜHL**, a t. of Rhenish Prussia, about 9 m. s.s.w. of Cologne, on the railway to Bonn. It is surrounded by old walls, and has a splendid château, erected in the early part of the 18th c. by the elector Clement Augustus of Bavaria. Pop. 4000.

**BRÜHL, HEINRICH**, Count von BRÜHL, prime-minister of Augustus III., king of Poland, and elector of Saxony, deserves a place in history as a signal example of an unworthy minister and venal statesman. He was born in 1700, at Weissenfels, and in early life entered, as a page, into the service of the duchess of Sachsen-Weissenfels. His winning address and tact gained for him rapid promotion through several offices of state, until, in 1747, he became prime-minister to that idle and unpatriotic ruler, Augustus III. Never was a ruler more slavishly obeyed by a statesman. B. would follow the prince, as he strolled about smoking, without speaking a word for a whole day; or, when his majesty lazily inquired: "Brühl, have you any money for me?" "Yes, sire," would be the constant reply; but in order to be able to give this answer as frequently as it was demanded, B. drained the coffers of the state, and burdened the country with debt. He, however, contrived to enrich himself, and to accumulate honors and titles. By Elizabeth of Russia, he was invested with the order of St. Andrew, and by Charles VI. of Austria, he was made a count of the empire. He kept 200 servants, paid his body-guard better than Augustus did his, furnished the costliest table, possessed the finest wardrobe, and, in short, maintained the most splendid establishment in the kingdom. "Of all statesmen," said Frederick II., "Brühl has collected the greatest quantity of fine clothes, watches, lace, boots, shoes, and slippers!" The effect of B.'s reckless robbery of the national finances to gratify the dissolute Augustus and himself, made itself felt at the outbreak of the seven years' war, when the country could only furnish 17,000 men to oppose Frederick of Prussia, who surprised and captured the whole Saxon army in its camp at Pirna. Augustus and B. fled to Warsaw. When peace was concluded, they returned to Dresden, where Augustus died on the 5th Oct., 1763, and was followed by his worthless parasite, 28th October.

**BRUISE**, or **CONTUSION**, signifies an injury inflicted by a blow or sudden pressure, in which the skin is not wounded, and no bone is broken or dislocated. Both terms, and especially the latter, are employed in surgery to include all such injuries in their widest range, from a black eye to a thoroughly crushed mass of muscle. In the slighter forms of this injury, as in ordinary simple bruises, there is no tearing, but only a concussion of the textures, the utmost damage done being the rupture of a few small blood-vessels, which occasions the discoloration that is always observed in these cases. In more severe contusions, the subjacent structures—muscles, connective tissue, vessels, etc.—are more or less ruptured, and in extreme cases, are thoroughly crushed, and usually become gangrenous. The quantity of blood that is extravasated mainly depends upon the size and number of the ruptured blood-vessels, but partly also on the nature of the textures of the injured part. Thus, a lax tissue, as that of the eyelids, favors the escape of blood into the surrounding parts. Moreover, the constitution of the patient has some influence, and many persons, especially (according to Mr. Paget, in his article on "Contusions" in Holmes's *System of Surgery*, vol. i.) pallid, fatty, soft-skinned women, though suffering from no apparent disease, are subject to extravasations, and consequently to discolorations, very disproportionate to the injuries that cause them.

The most characteristic signs of a recent contusion are more or less shock (q.v.), pain, swelling, and discoloration of the surface from effused blood (commonly known as *ecchymosis*, q.v.). There is nothing special in the character of the shock, but it is worthy of notice that it is most severely felt in injuries of special parts—as the testes, the breasts, and the larger joints, which are often followed by remarkable general depression, faintness, loss of muscular power, and nausea. The immediate pain following the blow is succeeded by a feeling of numbness, which, after a varying time, unless the part is killed, gives place to a heavy, aching pain. Although some depression may usually be observed immediately after the infliction of the blow, swelling of the parts rapidly follows, as may be well seen in the case of a child receiving a blow on the head, or of the wale that rises after the lash of a whip. In lax parts, such as the eyelids, the swelling is often considerable, and may remain for a week or more; but in other parts, it usually subsides in two or three days. The discoloration of the skin consequent on blows is of a more or less purple tint, varying from black to crimson or pink. "Black-

ness," says Mr. Paget (*op. cit.*), "usually indicating intense injury, is probably due to cure, and there is no inflammation or sloughing, the effused blood is generally absorbed, the liquid portion rapidly disappearing, while the blood-cells are more slowly removed. In some cases, it is probable that the effused blood becomes organized into vascular connective tissue, which takes part in the repair of the injured tissue. We need not follow the course of a B. in which active inflammation with suppuration ensues, or in which sloughing takes place, as these complications must be treated according to the ordinary rules of those affections. There are, however, one or two ill consequences following partial recovery, which require notice. Thus, in some organs, as the breast, abscess may ensue long after a blow; or a sensitive indurated lump may remain; or (more commonly) there may be long-continued pain, without change of texture; or, lastly, cancer may ensue. Blows on superficial bones, as those of the skull, are not unfrequently followed by very painful thickening of the periosteum; and a muscle violently struck may be paralyzed, and rapidly waste away; and constitutional diseases, such as gout and rheumatism, are well known to localize themselves with special severity in parts that have once been seriously bruised.

With regard to treatment, simple and not very severe bruises require little treatment but the rest necessary for the avoidance of pain; but the removal of the swelling and discoloration may be hastened by the application of various local stimulants, which seem to act by accelerating the circulation through the bruised part, and promoting the absorption of the effused fluid.

**BRULÉ**, a co. in S. Dakota; formed 1875. Area, 825 sq.m.; pop. 1890, 237. Co. seat, Chamberlain.

**BRÜLL**, IGNAZ, pianist and composer, b. in Prossnitz, Moravia, Nov. 7, 1846. He studied the pianoforte under Epstein, and composition under Rufinatscha and Dessoff, and appeared in concerts in Vienna and London with success. His works for the orchestra have given him fame as a composer, and he has also written chamber-music and several operas, which have taken a place in the modern repertory. These include: *Das goldene Kreuz* (Berlin; 1875); *Königin Marietta* (Munich, 1883); and *Das Steinernes Herz* (Vienna, 1888).

**BRUMAIRE** (Lat. *bruma*, winter), a division of the year in the republican calendar of France. It includes the time from Oct. 22 to Nov. 20. The celebrated 18th B., which witnessed the overthrow of the directory and the establishment of the sway of Napoleon, corresponds with Nov. 9, 1799, of the Gregorian calendar. See CALENDAR.

**BRUMIDI**, CONSTANTINE, 1805-80; a native of Rome, Italy, son of a Greek father and an Italian mother, widely known as a fresco painter. He was educated in the college of fine arts at Rome, and came to the United States in 1852. His first work, "The Crucifixion," was in St. Stephen's church in New York. Thence he went to Philadelphia and to the city of Mexico, at both places employing himself in church decoration. In 1854 he arrived in Washington, and was at once employed on the bare walls and ceilings of the national Capitol, the rotunda of which contains many fine pieces from his hand, combining mythology, allegory, and history. He left untouched or unfinished several accepted cartoons in his series, including "Oglethorpe and the Indians," "The Battle of Lexington," "Surrender of Cornwallis," "Decatur at Tripoli," "The Death of Tecumseh," "Entrance of General Scott into Mexico," and "The Discovery of Gold."

**BRUMMAGEM**, a corruption of the name of Birmingham, the manufacturing town in England. Of the many ways of spelling the name of this city, the oldest is that given in *Domesday Book*—namely, Birmingeham. This was corrupted into Brummagem, a term which has become synonymous with worthless wares with a glittering outside, since various kinds of cheap sham ware, especially jewelry, are manufactured at Birmingham.

**BRUMMELL**, GEORGE BRYAN, 1778-1840 (better known as "Beau" Brummell); a man of wealth and fashion, who became an intimate companion of the prince of Wales, and was looked upon by the society of his day as the "glass of fashion and the mold of form." He was the arbiter in all matters of fashion, and was considered the very top of perfection in taste, especially in dress. As long as his fortune lasted or the prince of Wales would contribute, he kept up an elegant bachelor-establishment in London; but finally he lost the favor of his royal friend, became poor, gambled recklessly, fled from his creditors, and died in France in a hospital for mendicants.

**BRUNCK**, RICHARD FRANÇOIS PHILIPPE, one of the most ingenious critics and philologists of modern times, was born at Strasburg, Dec. 30, 1729. He was educated under the Jesuits in Paris; but abandoned his studies, and for some time was engaged as a military commissary during the seven years' war. A professor in Giessen, with whom B. happened to lodge while the army was in winter quarters, revived in him the love of classical studies. Returning to Strasburg, he devoted all his spare time to Greek, and soon distinguished himself as an able but adventurous critic and emendator. His belief that all inaccuracies in ancient Greek writings were introduced by copyists, often led B. astray; but, since the revival of learning, few critics have done more for the progress of Greek literature. His first work, *Analecta Veterum Poëtarum Græcorum* (1772-76), was followed by several editions of Anacreon (1778-86), and



editions of Apollonius Rhodius (1780) and Aristophanes (1781-88), *Poëta Gnomici* (1784), Virgil (1785), and Sophocles (1786-89). The last of these established a new era in the criticism of the tragic writers. The outbreak of the French revolution interrupted B.'s studies. He ardently attached himself to the popular side. During the reign of terror, he was imprisoned, but was liberated after the downfall of Robespierre. His means, however, had been so much reduced that he was compelled to sell his valuable library. From this time, 1801, he turned his attention from Greek to Latin literature, and published editions of Plautus and Terence. He died June 12, 1808.

**BRUNDISIUM.** See **BRINDISI**.

**BRUNE, GUILLAUME MARIE ANNE**, a French marshal of the first empire, was b. at Brives-la-Gaillarde, 18th Mar., 1763. His education brought him at an early period into connection with the men of the revolution. Along with Danton, he helped to establish the Cordeliers' club. After the conquest of Belgium, he was sent as civil commissary to that country, but his warlike aspirations soon induced him to enter the military service. In 1797, he became brigadier under Napoleon in the army of Italy, and distinguished himself at Arcola and Rivoli, where he was made gen. of division and leader of the advance-guard. Sent by the directory to Switzerland in 1798, he executed his orders with brilliant success. In 1799, he was appointed to the command of the army of Holland, where he achieved the reputation of being one of the best generals of his age. He vanquished the Anglo-Russians at Bergen on the 19th of Sept., 1799, and on the 19th of Oct., forced the duke of York, commander-in-chief of the combined armies, to capitulate at Alkmaar, under humiliating circumstances. In 1803, he was named ambassador to the Ottoman porte, and was received by Selim III. with great distinction. In 1804, he obtained the dignity of marshal, and in 1805 returned to France. Two years afterwards, B. became governor-general of the Hanseatic towns, and was charged with the conquest of Pomerania; but circumstances having occurred which unnecessarily excited the distrust of Napoleon, he was recalled, and his future services dispensed with. After the fall of the emperor, he declared for the Bourbons, but his offers were rejected, and in consequence he joined Napoleon after his return from Elba. He was now made a peer, but the battle of Waterloo completely destroyed his prospects. He again made his submission, but was barbarously assassinated at Avignon, 2d Aug., 1815, by the populace, who were infuriated against him on account of certain crimes laid to his charge, of which, however, he seems to have been entirely guiltless.

**BRUNEHAUT**, or **BRUNEHILDE**, 534-613; daughter of Athanagild, king of the Visigoths and wife of Sigebert, king of Austrasia. Her sister Galsunda, the wife of Chilperic, king of Neustria and the brother of Sigebert, had been abandoned and murdered by Chilperic at the demand of his mistress, Fredegonda, who became queen. Brunehaut induced her husband (Sigebert) to invade Neustria, where, while besieging Tours, he was slain by emissaries of Fredegonda, and Brunehaut was taken prisoner by Chilperic. At Rouen she persuaded one of Chilperic's sons to marry her, and, with the help of the bishop of the place, she escaped to Austrasia, which was then ruled by Childbert; but she recovered her authority. After the death of Childbert she provoked war between her grandsons, heirs to the throne, in which one was killed, and she was about to take the throne when a son of Fredegonda, Clothaire II., interposed and captured her easily, as her army refused to fight. She was for three days exposed to torture and insult, and then tied to the tail of a wild horse and dragged to death, after which the body was burned and the ashes scattered to the air.

**BRUNEL, ISAMBARD KINGDOM**, an eminent engineer, son of Sir Mark Isambard B., b. at Portsmouth, England, in 1806, was educated at the college of Henri Quatre, Caen, in France. He commenced practical engineering in 1826, under his father at the Thames tunnel, and in the progress of that great work was often exposed to danger from the water breaking in and flooding the excavations, having more than once to save his life by swimming. He assisted in his father's experiments for making carbonic acid gas a motive power, and was designer and civil engineer of the *Great Western*, the first steamship built to cross the Atlantic; and of the *Great Britain*, the first ocean screw-steamer. The *Great Eastern*, the largest vessel ever built in the world, was erected under his sole direction. In 1833, B. was appointed chief engineer to the Great Western railway, and designed and constructed the whole of the tunnels, bridges, viaducts, and arches on this line, and extension branches. Among other docks at English seaports, in the improvement and construction of which he was engaged, may be mentioned the Bute docks at Cardiff, and the old North dock at Sunderland. In 1842, he was employed by government to construct the Hungerford suspension-bridge across the Thames at Charing Cross, London. In 1850-53, he constructed the works of the Tuscan portion of the Sardinian railway. He died suddenly, Sept. 14, 1859.

**BRUNEL, SIR MARK ISAMBARD**, the celebrated engineer of the Thames tunnel, son of an agriculturist, was born at Hacqueville, near Rouen, in France, April 25, 1769. He early showed an inclination for mechanics, and at school preferred the study of the exact sciences to the classics. His most remarkable undertaking was the Thames tunnel,

formed beneath the bed of the river, and which, commenced in Mar., 1825, was opened to the public in Mar., 1843. Assisted by his son, the subject of the previous article, he for ten years pursued a course of experiments for employing carbonic acid gas as a motive-power, but the cost of the machinery prevented its introduction as a substitute for steam. Among the less important of B.'s inventions, were machines for making wooden boxes; for ruling paper; for shuffling a pack of cards without using the hands; for the manufacture of nails; and for making seamless shoes for the army—the latter, tried for two years, was abandoned from economical motives. Elected a fellow of the royal society in 1814, he was appointed vice-president in 1832. He was knighted in 1841; and died, Dec. 12, 1849.

**BRUNELLESCHI, FILIPPO**, one of the greatest Italian architects, was b. at Florence, in 1377. He first learned the art of a goldsmith; next, that of a sculptor; and finally, devoted himself to architecture. He also studied zealously both mechanical and mathematical science, and is reckoned the first who established, on a sound basis, the theory of perspective. When still a young man, B. went to Rome, where he acquired a profound knowledge of ancient architecture, the result of which was that two ideas completely possessed his mind: the one was to revive the ancient style of architecture; the other was, to make himself master of the mechanical knowledge of the ancient architects. In 1407, he returned to Florence. In 1420, it was proposed to complete the structure of the cathedral of Santa Maria del Fiore, founded in 1296, and then only wanting a dome. A great assembly of architects from all quarters was convened to determine how it might be practicable to cover the vast octangular area. While the debate was going on, B. was earnestly elaborating his own designs; but when he first came forward and proposed his plan, it was so ill received, on account of its supposed absurdity, that B. was "lifted off his legs, and carried out of the room." He, however, obstinately persisted in explaining his scheme, and at last succeeded in convincing every one of its feasibility. The work was intrusted to him, and finished, with the exception of the lantern, with which he intended to crown the whole, but was prevented by his death in 1446. B.'s dome, measured diametrically, is the largest in the world, and served as a model to Michael Angelo for that of St. Peter's. Besides this *chef-d'œuvre*, B. executed several other great works, such as the churches of San Spirito and San Lorenzo, as well as the designs for the Pitti palace, which originated the beautiful style of Tuscan palace-architecture in the 15th century.

**BRUNETIÈRE, FERDINAND**, editor, b. in Toulon, France, in 1849; engaged in critical literature in 1870; became professor of the French language and literature at the Superior Normal School of Paris in 1886; member of the Legion of Honor in 1887; and in 1893 was appointed lecturer at the Sorbonne, elected to the French academy, and succeeded M. Buloz as editor-in-chief of the *Revue des Deux Mondes*. In 1897 he visited the United States and lectured before the students of Johns Hopkins and Columbia universities.

**BRUNI**, the name of an island to the s.e. of Tasmania, lying between Storm Bay and d'Entrecasteaux channel. The island is long and irregular in shape, being divided by a narrow isthmus into North and South Bruni island. The latter has a revolving light 335 feet from the sea level.

**BRUNI, LEONARDO**, a native of Arezzo, and hence styled *Aretino*, was b. in 1369. He merits notice as one of the most learned men who flourished during the epoch of the revival of Greek learning in Italy. He first studied law at Florence and Ravenna, but afterwards turned his attention to classical literature. He then went to Rome, where he filled several offices at the papal court. In 1414 he attended John XXII. to the council of Constance. On the deposition of that pope, he returned to Florence, where he was of service to the republic in several important matters. His *Historia Florentina* procured for him the rights of citizenship, and at a later period, through the favor of of the Medicean family, he was appointed state-secretary. He died 9th Mar., 1444. Florence and Arezzo vied with each other in the splendor with which they celebrated his obsequies. B. aided in advancing the study of Greek literature mainly by his literal translations into Latin of Aristotle, Demosthenes, Plutarch, and others. Of his original works, which are very numerous, we may mention *Commentarius Rerum suo Tempore Gestarum* (Ven. 1476); *De Origine Urbis Mantuæ*; *De Romæ Origine*; *Epistolæ Familiæres*; and *Vita di Dante e del Petrarca*.

**BRÜNN**, a fortified city of the Austrian empire, capital of the government of Moravia, is beautifully situated, partly on the slope of a hill, and partly in a pleasant valley, at the confluence of the Schwarzwawa and the Zwittawa, in lat. 49° 12' n., and long. 16° 37' east. Behind the city, on an eminence, is situated the castle of Spielberg, formerly the citadel, but now used as a state-prison, and noteworthy as the place in which Silvio Pellico was confined from 1822-30. Among the most interesting buildings of B. are the cathedral of St. Peter; St. James's church, a Gothic edifice, with a tower 276 ft. in height, and a valuable collection of ancient printed books; the church of the Minorites; and the Augustine convent. There are also several fine palatial residences belonging to the old

nobility. B. is one of the most important manufacturing towns in the Austrian dominions. Its woollens are specially celebrated, and it has a variety of other manufactures. The Rossitz coal mines are in the vicinity. Pop. in 1890, 95,342. Napoleon made B. his headquarters before the battle of Austerlitz.

**BRUNNEN**, a village of Switzerland, in the canton of Schwyz, of which it forms the port, near the mouth of the Muotta, in the lake of Lucerne. It is beautifully situated at the south-eastern bend of the lake, and is celebrated in history as the place where, in Dec., 1315, the deputies of the forest cantons, who, eight years before, had formed a plan for the liberation of their country from the Austrian yoke, laid the basis of the Helvetic republic.

**BRUNNER, OR BRUNN, JOHANN CONRAD**, 1658-1727; a German anatomist, professor in the university of Heidelberg, and physician to the elector palatine. He made many anatomical investigations, particularly in the pancreas, the small intestines, and the duodenum. His name lives in the *Brunner's Glands*.

**BRUNNER, SEBASTIAN**, b. 1814; chaplain of the university of Vienna, where he studied theology. In 1848, he established the *Vienna Church Gazette*. Soon after, he published, under the name *Nebelfungen-Lied*, a satire upon Hegel's doctrines. His entire works have been collected in 20 vols. Among them is a sharp criticism of Renan's *Life of Christ*. In all his writings he is of the ultramontane Roman Catholic school.

**BRUNNOW**, Count, ERNEST PHIL. VON, a Russian diplomatist, was b. at Dresden, 1797, and studied at the university of Leipsic. At the time of the congress of Aix-la-Chapelle, he entered the Russian service, and the ministers Nesselrode and Capo d'Istria recognized at once his fitness for a diplomatic career. Among other posts, he attended the congresses of Troppau and Laybach, acted one year as secretary to the embassy in London, went to the congress of Verona, and then occupied for a time a high office in St. Petersburg. He was present, in a civil capacity, in the campaigns of 1828 and 1829 against the Turks. In the autumn of 1839, he was sent on a special mission to London, to take advantage of the unpleasant feeling between Great Britain and France for drawing the cabinets of St. Petersburg and London closer together, and in the following spring was accredited as permanent ambassador. In this capacity he soon acquired distinction as a diplomatist. After retiring from London on the outbreak of the war in 1854, he represented Russia in Frankfort, and, along with count Orloff, was sent to the conference of Paris, Feb., 1856. Immediately after the treaty of peace had been concluded, he was sent on a special mission to London, to re-establish friendly relations between the courts of St. Petersburg and St. James's. He was afterwards appointed to the court of Prussia; but in 1858 he returned to his old place in London, where he was a great favorite. He represented Russia at the conferences in London in 1864 and 1871. In recognition of his services, he was raised by the emperor of Russia to the rank of count in April, 1871. In 1874, he retired to Darmstadt, where he died in the following year.

**BRUNO, SAINT**, the founder of the Carthusian order of monks, was b. at Cologne 1051, and received his earliest education in the school attached to the collegiate church of St. Cunibert. Subsequently, he studied at Rheims, where he distinguished himself so greatly, that bishop Gervasius appointed him director of all the schools in his diocese. B., however, soon began to be troubled by the wickedness of his time, and, anxious to escape from what seemed to him the general pollution, he took refuge, along with six pious friends, in a desert place near Chartreuse, in the diocese of Grenoble. Here, in 1086, he founded one of the most austere of all the monkish orders, which received its name from the locality whence it had sprung. See **CARTHUSIANS**. B. and his companions had each a separate cell, in which they practiced the severities of the rule of St. Benedict, keeping silence during six days of the week, and only seeing one another on Sundays. Pope Urban II., who was one of B.'s most eminent scholars, in 1089 summoned the saint to Rome. B. obeyed the call reluctantly, and steadily refused all offers of preferment. In 1094, he established a second Carthusian monastery, called La Torre, in a solitary district of Calabria, where he died in 1101. He was not canonized until 1628. B. left no written regulations for his followers. These first made their appearance in a complete form in 1581, and were enjoined on all Carthusians by Innocent IX.

**BRUNO, THE GREAT**, Archbishop of Cologne, and Duke of Lorraine, one of the most eminent men of his time, was b. about 928 A.D. He was the third son of Henry the Fowler, and the brother of Otto I., emperor of Germany. Baldric, bishop of Utrecht, and afterwards Israel Scottigena, and others, were his tutors. His surprising knowledge, sagacity, and eloquence secured for him an immense influence over the bishops and clergy, while, on the other hand, his liberality, meekness, and great earnestness of heart won the affections and reverence of the laity. Summoned by Otto to the imperial palace, he quickly assumed an influential position among the chroniclers, poets, and philosophers of the court. At a later period he was appointed archbishop of Cologne, and lord high chancellor of the empire. He accompanied Otto to Italy in 951, and honorably distinguished himself by his fidelity to his brother, when Otto's own son, Conrad, and others of his kindred rebelled against him. As a reward, the emperor appointed

him duke of Lorraine. B. died at Rheims, 11th Oct., 965. He wrote a commentary on the Pentateuch, and several lives of saints.

**BRUNO**, GIORDAÑO, the precursor of the school of modern pantheistic philosophers, was born at Nola, in the kingdom of Naples, about the middle of the 16th century. He entered, at an early age, the order of the Dominicans, but soon began to express his doubts in regard to the doctrines of transubstantiation and of the immaculate conception, in consequence of which he was obliged to flee from his convent. Henceforth, his life was unsettled. In 1580, he went to Geneva, where he spent two years, but having excited the suspicion and dislike of the strict Calvinists of that city by his general skepticism, he judged it prudent to betake himself to Paris, where he delivered prelections on the "great art" (logic) of Raymond Lully. His disputes with the bigoted Aristotelians of the university of Paris compelled him, however, to leave France. He passed over into England, where he resided for two years in comparative quiet, enjoying the friendship of sir Philip Sidney and the protection of the French ambassador, Michel de Châteauneuf de la Mauvissière. Here he composed his most important works, but at last, having incurred the displeasure of the clergy by his vehement denunciation of the Aristotelian philosophy, and other grave heresies, he returned to Paris in 1586. In 1588, he proceeded to the university of Marburg, where he matriculated; and to Wittenberg, where he became professor; but being asked to join the Lutheran communion, he refused. On his departure from the city, he pronounced an impassioned panegyric on Luther. After spending some time in Prague, Brunswick, Helmstadt, and Frankfort-on-the-Main, he resolved to go back to Italy. He fixed his residence at Padua; but after a stay of two years, he went to Venice, where he was arrested by the officers of the inquisition, and conveyed to Rome in 1593. He was now subjected for two years to persecution, in the vain hope that he would recant; but when all the endeavors of his enemies proved ineffectual, he was brought to the stake on the 17th Feb., 1600, and burned as an obstinate heretic. On this spot a statue was erected in 1839.

B.'s writings, of which the most valuable are composed in Italian, display throughout a strong, courageous, excitable soul, susceptible of deep enthusiasm, but vainly laboring to attain perspicacity. The *Cena delle Ceneri*, or evening conversations on Ash-Wednesday, is an apology for the Copernican astronomy; the *Spaccio della Bestia Trionfante*, or expulsion of the triumphant beast (Par. 1584), is a satirical but somewhat heavy allegory in the style of the times. His greatest works are metaphysical, such as the *Della Causa Principio ed Uno* (On the One Sole Cause of Things) and the *Del Infinito Universo e Mondi* (On the Infinity of the Universe and of Worlds). The doctrine enunciated in these is pantheistic. B. held that the infinite soul of God did not merely inhabit or pervade the universe, but that the universe was simply a manifestation of him, and therefore itself divine. God was therefore, in the most literal and physical sense, all in all. B.'s philosophy, in later times, was quite unappreciated, and even neglected, until Jacobi drew public attention to it in his *Letters on the Doctrine of Spinoza*. Both Spinoza and Descartes were much indebted to Bruno. Original editions of B.'s works are very rare. Those in Italian were published by Wagner in 1830; some Latin ones by Gfrörer in 1836. See Bartholomés's *Bruno* (1846); Frith's *Life of Bruno* (1887).

**BRUNONIAN SYSTEM OF MEDICINE.** See BROWN, JOHN.

**BRUNSWICK**, a co. in s.e. North Carolina, on the ocean and cape Fear and Waccamaw rivers; 890 sq. m.; pop. '90, 10,900. Co. seat, Southport.

**BRUNSWICK**, a co. in s.e. Virginia, on North Carolina, watered by the Roanoke and Nottaway rivers; 600 sq. m.; pop. '90, 17,245. Co. seat, Lawrenceville.

**BRUNSWICK**, a city and port of entry in Glynn co., Ga., on St. Simon's Sound, and the Plant System and the Southern railroads; 8 miles from the ocean, 80 miles s.w. of Savannah. It is more than a century old, but has attained its present importance since 1870. It has a spacious harbor with a lighthouse; exports cotton, phosphates, tar, rosin, turpentine, and pine lumber; is connected by steamers with New York, Ferdinanda, and Savannah; has churches, banking facilities, Glynn co. academy, and daily and weekly newspapers; and is supplied with water from artesian wells. Pop. '90, 8459.

**BRUNSWICK**, a town in Cumberland co., Me.; on the Androscoggin river and the Maine Central railroad; 8 miles w. of Bath, and opposite Topsham, with which it is connected by a bridge. It is at the head of navigation; is principally engaged in the lumber trade and in cotton manufacturing; and contains Bowdoin College (q.v.), the Maine State Medical School, several national and savings banks, an insurance company, board of trade, high school, public library, and weekly newspapers. It was settled in 1628. Pop. '90, 6012.

**BRUNSWICK**, DUCHY OF (Ger. *Braunschweig*), a state of northern Germany, consisting of three larger and five smaller distinct parts, and lying mostly within lat. 51° 38' to 52° 28' n., and long. 9° 23' to 11° 30' east. Its entire area amounts to 1424 square miles. Pop. in 1896, 494,213. For administrative purposes, B. is divided into six circles—viz., Brunswick, Wolfenbüttel, Helmstedt, Gandersheim, Holzminden, and Blankenburg. Of the three larger parts, the principal one, forming the circle of Wolfenbüttel, and including the capital, lies between Prussia and Hanover; the second, extending e. and w. from Prussia to the Weser, divides Hanover into two parts; and the third, forming the circle

of Blankenburg, lies to the s.e. between Hanover, Anhalt, and Prussia. The smaller parts are the isolated bailiwicks of Calvörde in the e., Thedinghausen in the w. (not far from Bremen), and some very small demesnes in the Hanoverian boundaries. B. belongs mostly to the basin of the Weser, which serves as a boundary on the west. The surface is mostly mountainous, particularly in the southern portions of the country, but B. has nevertheless level tracts of considerable extent. The rivers, with the exception of the Weser, are comparatively unimportant, though advantage is taken of one or two for the transport of timber. The climate in the low lands resembles the general climate of northern Germany; but in the Harz district it is so much colder, that harvest is generally a month later than in the plains.

The mines and quarries of B. produce marble, alabaster, limestone, gypsum, alum, iron, copper, lead, sulphur, and salt in large quantities, with some portions of gold and silver. Agriculture, which is carried on with intelligence and energy, constitutes the chief wealth of the duchy. The products include, beside the ordinary cereals, large quantities of leguminous plants, potatoes, tobacco, and beet-root. The pasture-land is extensive, and great attention is paid to the rearing of cattle, and especially to the breeding of sheep, wool being an important article of commerce. A large number of persons are employed in the cutting and preparation of timber. The chief manufactures of B. are of linen, stockings, woolen cloth, metals, porcelain, paper, sugar, glass, beer, etc.

The inhabitants are mostly Saxons, and nearly all Lutherans (16,419 Catholics in 1890). The people in the rural districts speak a broad low-German dialect. The government is a limited monarchy. As a state of the German empire, Brunswick has two votes in the Bundesrath (confederate council), and sends three deputies to the Reichstag. The budget is voted for a period of two years. The revenue for 1896-7 was given at 12,930,000 marks, the expenditure at 13,726,900. The public debt in 1895 amounted to 28,396,288 marks, four-fifths of it contracted for the establishment of railroads.

B. was included, as a part of Saxony, under the empire of Charlemagne. In 1285, B., with Lüneburg, was made a duchy under Otto, who died in 1252, and was succeeded, in 1267, by his son Albrecht, founder of the older line of Wolfenbüttel. John, another son of Otto, was the founder of the older Lüneburg line, which became extinct with William of Lüneburg in 1369. In 1569, Henry, who styled himself duke of Brunswick-Lüneburg-Dannenberg, founded the new house of Brunswick-Wolfenbüttel; and his brother William founded the new line of Brunswick-Lüneburg, which, in 1815, became the kingdom of Hanover. At the death of the childless duke William in 1884, the succession passed to the duke of Cumberland, son of George V. the dethroned king of Hanover, but as he refused to recognize the new constitution of the German empire, the imperial government declined to allow the succession to take place and an interregnum occurred. In October, 1885, Prince Albrecht, a nephew of the emperor, was elected regent of the duchy by the diet.

**BRUNSWICK**, the capital of the duchy of Brunswick, is situated on the Oker, in a level and fertile district, in lat. 52° 46' n., and long. 10° 4' east. B., which is a very old place, is supposed to have been first walled about the 9th c., by Bruno, duke of Ostfalen. But Henry the Lion, in the 12th c., so greatly beautified and extended the city that he may be almost said to be its founder. In the 18th c., B. became a member of the Hanse league, and soon attained considerable commercial prosperity, but its importance declined with the decay of the league. The town is most irregularly built, with narrow and crooked streets, but possesses the advantages of good causeways and an abundant supply of water. The cathedral—in which are preserved some interesting relics brought by Henry the Lion from the Holy Land—with the churches of St. Martin, St. Catharine, and St. Andrew, with its steeple 316 ft. high, are among the principal buildings. In the museum are some interesting antiquities and works of art by Jan Steens, Albert Dürer, Holbein, Rembrandt, Raphael, Guido, Ruysdael, Michael Angelo, and Benvenuto Cellini. The industry of B. consists chiefly in manufactures of woolen and linen, chicory, beet-sugar, tobacco, *papier-mâché*, lathered wares, etc. Its great annual fair, founded in 1498, is important. The old fortifications of B. have been demolished, and their site converted into pleasant promenades. A fine avenue of linden-trees leads to the duke's palace, an imposing edifice, built in 1869. Pop. 1895, 115,138.

**BRUNSWICK, HOUSE OF.** Henry the Lion, who held the united duchies of Bavaria and Saxony in the 12th c., may properly be called the immediate ancestor of this house, though they can trace their lineage back to Albert Azo I., margrave of Este in Italy, who died in 964. The eldest son of Henry the Lion became count palatine by marriage; his second son, Otho, died in 1218 after having been crowned German emperor, and it was therefore William, a younger son, who succeeded to the Brunswick inheritance. Otho, a grandson of Henry the Lion, was invested in 1235 with these domains as a fief of the empire and recognized as the first duke of Brunswick. Ernest the Pious, or the Confessor, who died in 1546, inherited the principalities of Brunswick-Lüneburg, and was the founder of both branches of the existing dynasty; he took an active part in the reformation and signed the confession of Augsburg. His descendant, Ernest Augustus, duke of Brunswick-Lüneburg, was raised to the dignity of ninth elector of the empire in 1692, by his marriage with Sophia, a granddaughter of James I. of England. His son George Lewis succeeded to the crown of Great Britain in 1714. Ferdinand, a later duke

of this house, entered the Prussian service in 1740, distinguished himself in the seven years' war, decided the battle of Prague, and gained the victories of Corfeld and Mindon. The ducal residence, which had been at Wolfenbuttel, was in 1754 removed to Brunswick by duke Charles; he founded the famous Collegium Carolinum, and was a faithful ally of England during the seven years' war. He died 1780. His successor, Charles William Ferdinand, was a nephew of Frederick the great, and married Augusta, daughter of George III. of England. He fought in the seven years' war, and played an important part at the battle of Krefeld in 1758. In 1792 he was commander-in-chief of the allied armies of Austria and Prussia against France. He marched into Champagne, but was compelled to conclude an armistice with Dumouriez after trying in vain to force the position of Valmy. In 1806 he was called to lead the Prussian troops against Napoleon, who defeated him at Jena and Auerstadt; he retired broken-hearted, and died soon afterwards from the effects of his wounds. Napoleon incorporated his duchy with the new kingdom of Westphalia, but after the battle of Leipsic it was restored to his son Frederick William, who had distinguished himself in the campaigns of 1792, 1798, 1806, and who fell at the head of his troops at the battle of Quatre-Bras in 1815. His son Charles Frederick was a minor, and up to 1828 George IV. of England acted as prince-regent. The people of B. endured the misrule of Charles Frederick for seven years; then they revolted and drove him out of his duchy in 1830. He died childless at Geneva in 1878. By an act of the Germanic diet the duchy was transferred to his brother William, prince of Oels (b. 1806), who assumed the government, April 25, 1831. He d. childless, 1884, and the succession passed to the duke of Cumberland, son of George V., the dethroned king of Hanover. As the heir refused to recognize the new constitution of the German government, his claim was rejected, and the nephew of emperor William, prince Albert of Prussia, was elected regent.

**BRUNSWICK BLACK** is a varnish employed for coating over coarsely finished iron grates, fenders, etc. It is mainly compounded of lamp-black and turpentine, and when applied with a brush, quickly dries, and leaves a shining jet-black surface.

**BRUNSWICK GREEN** is a pigment used in the arts, and consisting of the hydrated chloride and oxide of copper,  $\text{CuCl}_2 \cdot 8\text{CuO} \cdot 4\text{H}_2\text{O}$ . It may be prepared (1) by acting upon metallic copper with common salt and diluted sulphuric acid, (2) by acting upon metallic copper with moistened sal-ammoniac, or (3) by mixing sulphate of copper and common salt into a paste with water. It is found native at Atacama, in Chili, in the form of a green sand, hence the name *atacamite* (q.v.).

**BRUSA**, or **BURSA**. See **BROUSSA**.

**BRUSASORCI**, or **DOMENICO RICCIO**, 1494-1567; an Italian painter noted for his close imitation of Titian. He worked chiefly in fresco, and on mythological themes. The "Coronation of Charles V.," the "Procession," "Phaethon," and the "Martyrdom of St. Barbara," are among his more important achievements.

**BRUSH, CHARLES FRANCIS**, electrician; b. in Euclid, O., March 17, 1849; graduated at the university of Michigan in 1869; appointed a chevalier of the Legion of Honor in 1881; inventor of a dynamo for arc lighting, a lamp for use on a large electric circuit, and of many devices for the perfection of electric lighting.

**BRUSH, GEORGE JARVIS**, b. New York, 1831; educated at Yale, and at Munich, and the Freiberg mining academy; chief of the Sheffield scientific school (of Yale), and professor of mineralogy and metallurgy in Yale college. He has written upon various scientific subjects in the *American Journal of Science*, and assisted in editing Dana's *Mineralogy*.

**BRUSHES AND BROOMS**, implements of vegetable fiber or hair of very early use, mentioned by Homer. Brushes with single tufts, such as are used by artists, are made of the but one tuft, and are such as hair pencils and painters' brushes. The compound have more than a single tuft. Where they are placed side by side on flat boards they are called stock brushes. Those with single tufts, such as are used by artists, are made of the hair of the camel, goat, badger, and of hog's bristles. The hairs for pencils are arranged so as to form a point in the center, and are fixed in a quill or other small tube. Compound brushes are of set or pan work, and of drawn work. The ordinary house broom is an example of pan work, into the stock of which holes are bored of the size desired. The bristles, hairs, or fibers needed to fill each hole are collected, the thick ends dipped into molten cement, usually pitch, bound with thread, dipped again, and with a quick twist set into the hole. In drawn brushes, those intended for shoes, teeth, nails, etc., and clothes, the holes are more carefully bored, and have smaller ones at the top communicating with the back of the brush, through which a loop of wire passes from the back of the stock. Half the number of hairs or fibers needed to fill the holes are passed around the wire, which is then smartly drawn up so as to double the hairs and force them as far as possible into the hole. The outside ends are made even with trimming, and the backs of the brushes are covered with veneer to conceal the wire-work. Bristles are imported from Poland, Russia, and other countries. In 1808, the manufacture of brushes from the fibers of whalebone, and in 1810, from twigs of broom, rushes, and other plants, was patented. In 1842, split quills were added, and in 1872, horn and other substances. The great staple in the United States is broom-corn, a considerable amount being raised in the state of New York, and manufactured by the Shakers. Revolving

brushes were patented in 1811; and in 1862, revolving hair brushes, for the use of barbers, were introduced, but they have never become popular. As long ago as 1690, there was invented "a new engine for sweeping the streets of London, or of any city or town." But nothing of the kind was put in use until 1825, when revolving brooms were used. A great many improvements followed, and at the present time street-sweeping by such machines is common in large cities. The most important recent invention in brush-making is of American origin, the Woodbury machine for bunching, wiring, and inserting bristles in the stock. In this machine a metal comb of uniform thickness is filled with bristles, holding them by the middle, so that one half of the bristles appear above the surface of the comb, and the other half underneath. The comb thus charged moves in guide-ways, and discharges bristles from each division successively into a channel in which they are brought into a horizontal position and a proper quantity taken up to form a tuft. This tuft is moved along an incline against the end of a cylinder, when a plunger doubles the bristles into a loop, which is seized by wire, and in an instant securely fastened.

**BRUSH TURKEY**, the native name of an Australian bird of the megapodidae family, of which a dozen species are known; called also the New Holland vulture, jungle fowl, and native pheasant. It is the only wild fowl known that is gregarious in the duty of hatching. Before the time for laying eggs, several pairs of these birds unite in building an enormous pyramidal heap of vegetable matter in part decayed. In this muck-heap of leaves, grass, and rotting wood the females deposit their eggs, which are placed about a foot from each other and covered 2 ft. deep. The hatching is done by the heat of the decaying matter, and the young appear full feathered and able to take care of themselves from the first. Nests have been found that contained a bushel of eggs. Some species of the brush turkey place their eggs in sand, some construct huge mounds of earth, and some make excavations on the sea-shore. In size and general appearance it much resembles the common domestic turkey.

**BRUSSELS** (Fr. *Bruxelles*), the capital of Belgium, is situated on the small river Senne, a tributary of the Dyle, in lat. 50° 51' n., and long. 4° 21' east. It communicates with Antwerp and the Baltic sea, by means of the Scheldt canal, and railways connect it with Germany, France, and Holland, as well as with all the principal towns of Belgium. The city is built partly on the side of a hill, and partly on a fertile plain; and though some of the streets are so steep that they can be ascended only by means of stairs, B., on the whole, may be pronounced one of the finest cities in Europe. The upper town, situated on the side of the hill, is the newest and most fashionable, and is the residence chiefly of the great and wealthy. The king's palace, public offices, chief hotels, and mansions of foreign ministers are here. It is also much more healthy than the lower town, which, stretching along the canal and the Senne, is greatly subject to fogs. But the latter, with its numerous handsome old buildings, formerly belonging to the Brabant nobility, but now occupied by merchants and traders, has a fine picturesque appearance, while some of its public edifices are unrivaled as specimens of Gothic architecture. This part has also several noble churches, but it is now wholly given over to trade. French is spoken in the upper part of B.; but in the lower, Flemish is prevalent, and in one quarter the Walloon dialect is spoken. The English language, owing to the large number of English who reside in B. for economy, is also very common. The walls which formerly surrounded B. have been removed, and their place is now occupied by pleasant boulevards, shaded by alleys of trees, extending several miles. The *Allée Verte*—a double avenue along the Scheldt canal—forms a splendid promenade, and leads towards the palace of *Laeken*, the suburban residence of the royal family, 3 m. n. of the city. Besides the fine park in the upper town, covering an area of some 17 acres, ornamented with fountains and statues, and surrounded by the king's palace, the "palace of the prince of Orange," the chamber of representatives, and other buildings, B. has several other squares or places, among which the most noteworthy are—the *Place Royale*, with its colossal monument of Godfrey of Bouillon; the *Grande Place*, in which is situated the Hôtel de Ville, a splendid Gothic structure, erected in the beginning of the 15th c., with a pyramidal tower 264 ft. high, surmounted by a statue of St. Michael, the patron saint of B., and where, in 1568, the patriot counts, Egmont and Horn, were beheaded by order of the duke of Alba; and the *Place des Martyrs*, where a memorial has been erected to those who fell here in the revolution of 1830. Among the churches of B., the largest and finest is the cathedral of St. Gudule, which dates from the 12th c., and is built in the pointed Gothic style, with two towers of more modern date, rising on each side to a height of 264 ft., many richly painted windows, a pulpit, considered the masterpiece of Verbruggen, and monuments of the dukes of Brabant and other distinguished persons. In the *Palais des Beaux Arts* is the picture-gallery, containing the finest specimens of the Flemish school of painting; the public library, with a great number of old MSS., collected by the dukes of Burgundy—MSS. interesting and valuable not only for their contents, but for the beautiful miniature paintings with which the scholars of Van Eyck adorned them. The observatory is one of the finest in Europe. The educational establishments of B. are numerous, the principal being the free university, founded in 1834, with four faculties—viz., law, medicine, mathematical and physical sciences, and philosophy, and having a special school of

pharmacy attached. It has also numerous charitable and benevolent institutions; and is the seat of the provincial government of s. Brabant, as well as of the general government of the kingdom. B. is one of the chief centers of the industry of the country. Its lace is particularly famous. Of the esteemed carpets which pass under the name of B. carpets, only a few are manufactured here, most of those of Belgic make being produced at Tournai. It has also manufactures of damask, linen, ribbons, paper, jewelry, hats, soap, porcelain, mathematical and musical instruments, etc. Carriage-building is also an important branch of industry. Printing and lithographic establishments are numerous; and about a dozen newspapers, of which the *Indépendance Belge* has a European reputation, are published daily. Pop. in 1895, with suburbs, 518,387.

As early as the 8th c., we find B. (*Bruchella*), then probably a villa of the Frank kings, mentioned in old chronicles, and that a church existed here in 966 is proved by a deed of the emperor Otho I. Under Charles V., B. was made the court-residence in the Netherlands, and became afterwards, under Philip II., the chief arena of the revolution, and of the atrocities committed by the duke of Alba and the inquisition. B. suffered greatly in the war of Spain against Louis XIV.—in whose reign it was bombarded by marshal Villeroi, and upwards of 4000 buildings destroyed—and in that of Austria against Louis XV.; but still more from the continual prevalence of party animosities caused by the policy of Austria. Under the mild rule of Maria Theresa, B. flourished greatly, and in this time, many of its best institutions and public buildings were founded. In 1789 occurred the Brabant revolution under Joseph II., and scarcely had Austrian rule been re-established, after a brief time of independence, when B. fell into the hands of the French, 1792. After other changes of fortune, B., with the other parts of Belgium, was incorporated with the kingdom of the Netherlands in 1815, and so remained until the revolution of 1830, by which it became the capital of the independent kingdom of Belgium.

#### BRUSSELS CARPETS. See CARPETS.

**BRUSSELS SPROUTS**, one of the many cultivated varieties of *brassica oleracea* (see CABBAGE). It is distinguished by producing, in the axils of the leaves, little clusters of leaves which close together and form miniature cabbages. These are used, like other greens of this species, for the table, and are very delicate. The plant is cultivated much in the same way as cabbage or kale, requiring, however, less space than most of the varieties. It may be planted in shady situations, or between the rows of crops, such as pease, beans, scarlet-runners, etc., which are to be removed from the ground in autumn. The sprouts are fit for use chiefly in winter and spring. The stem sometimes attains a height of 4 ft., and the head resembles a small, imperfectly boiled savoy; but there is a subvariety with shorter stems, preferable for many situations. In some places, it is customary to remove the head early in winter, in order to promote the development of the lateral shoots in spring; but if the head is allowed to remain, the plant becomes taller, and new shoots are formed as the lower ones are removed. The seed is sown in Feb. or March. Seed is very generally exported from Belgium, as this vegetable is said to degenerate in Britain. Its use has of late rapidly extended, and none of the many varieties of the species to which it belongs is better deserving of cultivation.

**BRUTTIUM**, an ancient division of Italy, comprising the s. portion, now Calabria. The people known as Brutians became rulers in the peninsula about 856 B.C. Before that period the people seem to have been of some Pelasgian races, but at an early date Greek adventurers started settlements on the coast, of which the more important were Crotona, Rhegium, and Locri. The warlike Greeks subjected the natives and held them in slavery until after the Peloponnesian war. At that period the Lucunians came in from the n. and still further oppressed the natives. At last, about the middle of the 4th c. B.C., the people rising against oppression became their own masters; they gained power rapidly, captured some of the Greek cities, and, assisted by the Lucunians, held their own against the Grecian arms. The B. were powerful until after their participation in the Samnite war against Rome, 283 B.C. Not long afterwards they were subjected to Rome and gave up much of their territory. In the second Punic war they revolted and assisted Hannibal, for which they were punished by Rome in the sacrifice of what little they had left of independence. At that time the Brutti as a nation disappeared from history.

**BRUTUS**, **LUCIUS JUNIUS**, figures in the legendary history of early Rome, as the hero who overturned the monarchical, and established the republican form of government. The legend runs that he was the son of a rich Roman. On his father's death, Tarquin the proud took possession of the property, and put an elder brother to death, and B. himself only escaped the same fate by feigning idiocy (hence the name *Brutus*, stupid). The oracle of Delphi foretold that he should govern in Rome. Remembering his own wrongs, and gifted with the strength and wisdom of one who was fulfilling the decrees of fate, B., when the foul rape committed by one of the royal family upon Lucretia had shocked the people, convoked them, placed himself at their head, and drove the kings from Rome. He is said to have been then elected one of the two first consuls (509 B.C.). That his character as a stern old Roman hero might be complete, the legend adds that he sacrificed to the new republic his own sons, detected in a conspiracy to restore the



monarchy; and that at last he fell in mortal combat repelling an attack led on by one of the sons of Tarquin. Little more, however, can be said to be established upon sufficient historical evidence with regard to B., than that there existed a person of that name who held high office in Rome at a very early period.

**BRUTUS, MARCUS JUNIUS**, b. 85 B.C., appears to have spent the early years of manhood in exclusive devotion to literary pursuits, and not to have taken part in the political dissensions agitating Rome till he had attained a mature age. When the civil war broke out between Pompey and Cæsar, he sided with the former; but after the battle of Pharsalia, made his submission to the latter, and, in the following year, was appointed governor of Cisalpine Gaul. On returning to Rome, he divorced his wife, in order to marry Portia, the daughter of Cato, of whose principles in politics he professed to be a disciple. The influence of Cassius prevailed upon him to join the conspiracy which ended in the murder of Cæsar. The efforts of B. to retain popular favor afterwards being unavailing to counteract the effects of the eloquence of Antony, he was forced to leave first Rome, and then Italy. The remainder of his life was spent partly in Athens, partly in Asia Minor, and partly as the leader of a marauding force which maintained itself by plundering the inhabitants of the eastern shores of the Adriatic. Defeated by Antony and Octavianus (Augustus) at Philippi (42 B.C.), he terminated his life by falling upon his sword.

**BRÜX**, a t. of Bohemia, situated on the Bila, about 14 m. n. of Saatz. In its vicinity are extensive coal-mines, and the famous mineral springs of Püllna and Seidlitz, from which the inhabitants of B. prepare a considerable quantity of salts. Pop. of commune, '90, 14,894.

**BRUYÈRE, JEAN LA.** See LABRUYÈRE.

**BRUYS, or BRUIS, PETER DE**, a priest of southern France supposed to have been one of Abelard's pupils, founder of a sect by the name of Petrobrussians. He opposed the church as it was, seeking to restore the Christian religion to its original simplicity and freedom from symbols, denied the authority of any established hierarchy and the necessity of any priestly ministration, opposed infant baptism and the communion, and held that, as prayer could be offered anywhere, churches were useless. His followers destroyed images, burnt crosses, and maltreated priests. After many years of non-molestation B. was burnt at the stake at St. Gilles about 1126. The sect existed for a long time under the name of Henricians, from Henry of Lausanne, one of their leaders.

**BRYAN, a co. of e. Georgia**, on the sea-coast; 400 sq. m.; pop. '90, 5520, incl. colored. The soil is level and mostly of sand, and in a large degree covered with pine forests. The Savannah, Florida, and Western railroad passes through the county. Productions, rice, corn, cotton, etc. Co. seat, Clyde.

**BRYAN, MICHAEL**, 1757-1821; an English art critic and connoisseur, author of a *Dictionary of Painters and Engravers*, a recognized standard work. In 1794, he was employed by several English noblemen to purchase the Orleans gallery of paintings.

**BRYAN, WILLIAM JENNINGS**, politician; b. in Salem, Ill., March 19, 1860; educated at Illinois college and the Union college of law at Chicago; removed to Lincoln, Neb., in 1887; elected to congress in 1890 and 1892; became editor of *The World-Herald* in 1894; and was the unsuccessful candidate of the Democratic and Populist parties for president of the United States, in 1896, receiving 176 electoral votes.

**BRYANT, JACOB**, an eminent English scholar, was b. at Plymouth in 1715. He was educated at Eton and King's college, Cambridge, where he took his degree of M.A. in 1744. In 1756 he became private secretary to the duke of Marlborough, and accompanied his grace to the continent. Substantial proofs of the duke's esteem raised him above the region of pecuniary cares, and enabled him to devote his whole life to letters. He d. 14th Nov., 1804. Among his numerous publications may be mentioned: *Observations and Inquiries relating to various Parts of Ancient History* (Cambridge, 1767); *A New System or Analysis of Ancient Mythology* (1774-76); *Vindicia Flavianæ* (a defense of Josephus's testimony in regard to Christ), (1780); *Treatise on the Authenticity of the Scriptures and the Truth of the Christian Religion* (1792); *A Dissertation concerning the War of Troy, etc.* (1796); *The Sentiments of Philo-Judas concerning the Logos* (1797); and a variety of dissertations on the difficult passages of Scripture (1808).

**BRYANT, WILLIAM CULLEN**, a distinguished American poet and journalist, was born in Cummington, a mountain town of Hampshire co., Mass., Nov. 3, 1794, and on both sides of his house was descended from old families of Plymouth co. His father, Peter Bryant, a physician of more than ordinary culture, who took great pains to educate his children, encouraged William in his attempts to compose, urging him to imitate Pope, and when ten years of age the boy contributed a poem relating to school-life to a county newspaper. In 1807 he acquired wider fame, friends having published in Boston *The Embargo, or Sketches of the Times; a Satire by a Youth of Thirteen*. In 1809 a second and enlarged edition appeared, including *The Spanish Revolution*, and a preface assuring the incredulous public that the author was really a youth. Bryant entered the sopho-

more class at Williams College in 1810, but before the year was ended withdrew, intending to enter the junior class at Yale. His father's means not permitting this, he began the study of law in the adjoining town of Worthington, but continued to cultivate his gifts, producing the noble poem *Thanatopsis*, one of the most impressive known in the English language. In 1814 he removed to Bridgewater, Plymouth co., his father's birth-place, to finish his studies, and in 1815 was admitted to the bar at Plymouth. Returning to Hampshire co., he practiced for eight months at Plainfield, and then removed to a wider field, Great Barrington, where he distinguished himself as a lawyer and orator, and where, in 1821, he married Miss Frances Fairchild. *Thanatopsis* was published, in 1817, in the *North American Review*, exciting general admiration, and among other contributions to the same periodical was his first ambitious prose composition, an *Essay on American Poetry*. In 1821 he read, by invitation, a didactic poem, *The Ages*, before the Phi Beta Kappa Society of Harvard College, and in that same year published at Cambridge a volume of his collected poems. His distaste for the law increasing, he decided to give literature the preference, and by the advice of friends removed to New York, in 1825, to become the editor of the *New York Review*, an unsuccessful venture.

In 1826 he was made assistant editor of the *Evening Post*, and in 1829 editor-in-chief. Under him the paper became decidedly democratic, but its editor entered warmly into the anti-slavery struggle, and in 1856 aided in forming the Republican Party, giving most efficient support to the government during the civil war. Chiefly owing to Bryant, the *Post* early became noted for its dignity and high moral tone, and for its bold advocacy of free-trade and of international copyright laws. From 1827 to 1830 Bryant aided in editing *The Talisman*, a popular annual. In 1832 a complete collection of his poems appeared, which was reprinted in London with a flattering preface by Washington Irving. This received high praise from English critics, and was followed by *The Fountain and Other Poems* (1842); *The White-Footed Deer and Other Poems* (1844); an illustrated edition of his poems (1846); a complete edition in two vols. (1855); *Thirty Poems* (1864); a translation of the *Iliad* (1870); and of the *Odyssey* (1871), work on these having been commenced in 1866. After 1845 Roslyn, L.I., was one of Bryant's summer homes, Cummington and its beautiful scenery still keeping their hold upon his affections. In 1834, 1845, 1849, and 1857 Bryant visited Europe, in 1849 extending his travels to Egypt and Syria; and his letters to the *Post* were republished as *Letters of a Traveler*, and *Letters from Spain and other Countries*. Among other works, original or compiled, were *The Library of Poetry and Song* (1876); with Sidney Howard Gay, a *Popular Illustrated History of the United States* (1878-82), and with E. A. Duyckinck, a new edition of *Shakespeare*. Few men in public life were as widely honored for culture, wisdom and probity as Bryant, and he was frequently called on to address assemblies gathered to commemorate the lives and works of eminent persons. His literary friends found expression for their esteem by a festival at the Century club in 1864, on the completion of his seventieth birthday, and again in 1876, when he was presented with a beautiful silver vase, ornamented with designs representing the flowers and birds about which he had so lovingly written. He died from the effects of a fall, June 12, 1878.

In his *Poets and Poetry of America*, Griswold characterizes Bryant's poetry as "permeated by a pure and genial philosophy, a solemn and religious tone that influences the fancy, the understanding and the heart." His prose is marked by the same elegance, clearness, vigor, and purity of diction, and a feature of both is an intimate and loving acquaintance with nature. See the complete edition of his works (4 vols., 1868-84); the *Life*, by his son-in-law, Parke Godwin (2 vols., 1883); *Prose Writings of William Cullen Bryant* (2 vols., 1884); *Bryant and His Friends*, by James Grant Wilson (1886).

**BRAXIS**, a Greek sculptor, contemporary of Praxiteles and Scopas, with whom he participated in the work on the mausoleum at Halicarnassus about 345 B.C. He also created five colossal figures of the gods at Rhodes, of Bacchus at Cnidus, of Æsculapius and Hygeia at Megara, Apollo in the grove of Daphne at Antioch, a statue of Pasiphaë, and a portrait of Seleucus. It is thought that B. was the first to produce statues of Æsculapius and Serapis.

**BRYCE, JAMES**, b. Belfast, 1838; educated at Glasgow University and at Trinity coll., Oxford. He was called to the bar in 1877; was Regius prof. of civil law, Oxford, in 1870-93; became a member of the House of Commons, 1880; parliamentary secretary of foreign affairs in 1886; and President of the Board of Trade in 1894. He is the author of *The Holy Roman Empire*; *Travels in Transcaucasia*; *The American Commonwealth* (1889).

**BRYDGES, Sir SAMUEL EGERTON**, 1762-1837; an English author, bred to the law. He was a prolific writer, and is said to have produced 2000 sonnets in a single year. His more important works are *Censura Literaria* in 10 vols., *The British Bibliographer* (4 vols., 1810-14), and his own *Autobiography*, *Times and Opinions*.

**BRYENNIOS, PHILOTHEOS**, b. of Greek parents near Constantinople, 1833; educated in the Patriarchal seminary at Chalce, and attended courses at the universities of Berlin, Leipsic, and Munich, where he became familiar with German theology. He consorted with western theologians more frequently than is customary for Greek

ecclesiastics, and attended the Bonn conference of Old Catholics, 1875. He was prof of church history at Chalde; metropolitan of Serra; and afterward metropolitan of Nicomedia, in ancient Mesopotamia. He was the discoverer of two *Epistles of Clement*, and of *The Teaching of the Twelve Apostles*, the publication of the latter, in 1883, being one of the most notable theological events of the day. Both manuscripts were found in the monastery of the Holy Sepulchre, Constantinople. See TEACHING OF THE TWELVE APOSTLES.

**BRYN MAWR COLLEGE**, at Bryn Mawr, Pa., five miles from Philadelphia, was founded by Joseph W. Taylor, M.D., a member of the Society of Friends, of Burlington, N. J. Dr. Taylor's object was to found an institution for the advanced education of women. In 1879 he purchased land and began the erection of buildings. At his death in 1880, he bequeathed \$800,000 to the college. The officers of administration and instruction were chosen in 1884, and in the fall of 1885 the college opened with 44 students. The trustees are members of the Society of Friends, but the students may be of any denomination. The buildings of the college include Taylor Hall, which contains lecture-rooms, chemical, physical, and biological laboratories, and the offices of administration; and five halls of residence, two of which, Pembroke Hall and Denbigh Hall, accommodating 182 and 90 students respectively were opened in 1891 and 1894 respectively. A third hall of residence, known as Denbigh Hall, was opened in the fall of 1890. A well-equipped gymnasium with swimming pool is open to the students. The library contains 25,000 bound volumes and 7000 pamphlets. The number of students in the year 1896-7 was 289, of whom 46 were graduates, the remaining 243 undergraduates. The number of professors is 15, of other instructors 34. Eleven fellowships, in Greek, English, mathematics, history, and biology, are awarded annually, and there are three European Fellowships conferred upon members of the graduating class, who receive the sum of \$500 to defray the expenses of a year's study in some foreign university.

**BRYOLOGY** (Gr. *bryon*, a moss; *logos*, discourse), a subdivision of botany; that part of the science of botany which treats of mosses. The term *muscology* (from Latin *muscus*, moss) is also employed as synonymous with bryology.

**BRYONY**, *Bryonia*, a genus of plants of the natural order *cucurbitaceae*, distinguished by triadelphous stamens, with distinct anthers, a trifid style, and a few-seeded fruit destitute of hard rind. The stems climb by means of lateral tendrils, the leaves are angular or 8 to 5-lobed, and the flowers campanulate, 5-partite, unisexual, and generally yellow. The COMMON BRYONY (*B. dioica*), the only British species, is frequent in hedgerows in England, but is not indigenous to Scotland. It has cordate palmate leaves, axillary bunches of flowers, and red berries about the size of a pea. It abounds in a fetid and acrid juice. The root is perennial, very large, white and branched, has a repulsive smell, and is acrid, purgative, and emetic. *B. alba*, common in the middle parts of Europe, possesses similar properties. The root of both is applied topically to bruises, and was formerly very much in use as a purgative. It is now again much employed in homeopathic practice. A decoction made of 1 lb. of the fresh root is said by Withering to be "the best purge for horned cattle." It contains a bitter extractive, called *bryonine*, to which it seems to owe its properties. The young shoots of both species are, however, so free from acrid and dangerous qualities, that they may be used as pot-herbs.—The roots of other species of the genus are also acrid and purgative; but it is said that the root of *B. abyssinica*, when cooked, is eaten without danger.—BLACK BRYONY (*tamus communis*) is a plant of a different natural order (*dioscoreaceae*, q. v.).

**BRYOPHYLLUM** (Gr. *bryon*, blossom, and *phyllon*, leaf), a genus of plants of the natural order *crassulaceae* (q. v.). *B. calycinum*, a succulent shrubby plant, a native of the Moluccas, with quinate or almost pinnate leaves, oblong deeply crenulated leaflets, and panicles of large pendulous greenish-yellow flowers, is not unfrequent in American hot-houses, being regarded as an object of interest, upon account of its producing buds on the edges of the leaves more frequently than almost any other plant. These buds are capable of forming independent plants. This curious mode of propagation is found also in the bog orchis (*malaxis paludosa*), a plant of a very different natural order. See BUD and LEAVES.

**BRYOZOA**. See ZOOPHYTES.

**BRYUM** (Gr. *bryon*, moss), a genus of mosses (q. v.) distinguished by a terminal fruit-stalk, a double *peristome* (see MOSSES)—the outer one of 16 teeth, the inner a membrane cut into 16 equal segments—and a dimidiate *calyptra*. The species are very numerous, and many of them are natives of Britain. They are all small, their stems short, and their leaves forming little rosettes, from the center of which the fruit stalk springs. They very generally grow in dense patches on wet rocks, wet earth, the bark of trees, etc., beautifully clothing them with bright green.

**BRZESE**, or BREST LITOVSKI, a walled t. of Russia, in the government of Grodno, about 108 m. s. from the city of the same name. Being advantageously situated on the right bank of the Bug, it has an extensive trade. It was the scene of a battle between the Russians and Poles in 1794. Pop. '92, 44,140.

**BRZEZAN**, a t. of Galicia, situated on the Zlota-Lipa, about 50 m. s.e. of Lemberg. It has an old castle and a gymnasium, and manufactures of linen, sail-cloth, and leather. Pop. '90, 11,221.

**BUA'CHEE**, or **GARDEN ISLAND**, an island of Western Australia, near the mouth of Swan river, in lat. 33° 10' s., and long. 115° 40' east. Though measuring only 6 m. by 1, it is yet important as sheltering from the open ocean the deep and spacious anchorage of Cockburn sound, which flows between it and the mainland of the colony.

**BUANSUAH**, a wild dog of India, conjectured to be the progenitor of the domestic animal. It is very shy, lives in thick woods, and, like the wolf, hunts in packs. In companies of a dozen these animals do not fear to attack the tiger. If captured young they are easily tamed.

**BU'AZE**, a s. African plant, of which the botanical characters and relations are not yet known, but which is likely to prove of importance on account of its fiber. Dr. Livingstone found it growing in large quantities in the Maravi country, n. of the Zambesi; but he could not procure any specimen in flower or fruit, and Dr. Hooker did not recognize the specimens of branches and leaves. It is not cultivated, and the only use to which it is put by the natives is to afford threads for stringing beads on; but Dr. Livingstone thinks its fiber stronger and finer than flax, and says that a firm thread of it feels like catgut in the hand, and would rather cut the fingers than break.

**BU'BALUS**, **BU'BALIS**, or **BU'BALÉ**, *Antelope bubalus*, supposed to be the *bubalus* of the ancients—although that name is now generally appropriated to the buffalo (q.v.)—a species of antelope, of that section of the genus which is characterized as *bov*-form or ox-like. The Arabic name is *bekker-el-wash*, which signifies wild ox. It is an animal about the size of a large stag, with very ox-like head and muzzle—the head, however, remarkably long; the horns about as long as the head, surrounded by a succession of thickened rings, curved so as somewhat to resemble the sides of a lyre, the points directed backward. The general color is yellowish-brown, but the tail is terminated by a black tuft. The B. is an animal of rather coarse appearance, very destitute of the gracefulness of the typical antelopes. It inhabits Barbary, and occasional wanderers make their way to the banks of the Nile. It is figured on the monuments of ancient Egypt. It is gregarious in its habits. It is said to be easily domesticated. The most nearly related species to this, of other antelopes known, is the *kaama* (q.v.) of s. Africa.

**BUBASTIS**, a goddess of the Egyptians, was, in their mythology, the child of Isis and Osiris, and the sister of Horus. She was identified by the Greeks with Artemis (Diana), though upon what grounds is unknown, as the best information with regard to her is, that she was the goddess who presided over pregnancy and childbirth. The chief temple erected to B. was at Bubastis (q.v.). B. is represented on monuments as having the head of a cat, an animal which was sacred to her.

**BUBASTIS** (the *Pi-deseth* of Scripture, and modern *Tel Basta*), a ruined city of Egypt, about 14 m. n. of Belbeys, in lat. 30° 30' n., and long. 31° 33' east. B. derived its name from the Egyptian goddess Bubastis, in whose honor a temple was erected here, which, if not so large and magnificent as some Egyptian temples, was, according to Herodotus, one of the most beautiful, and vast numbers of persons were wont to make annual pilgrimages to it. Nothing but some stones of the temple, which are of the finest red granite, now remain. There are some other ruins, and mounds of great extent, consisting chiefly of the remains of brick houses and heaps of broken pottery.

**BUBBLE**, as a term, is defined by Blackstone as an unwarrantable undertaking by unlawful subscriptions, subjecting the parties who originate and put them in operation to the penalties of *premunitio* (q.v.). The *South-sea scheme* (q.v.) was a terrible example of such a bubble.—The **BUBBLE ACT** is the name given to the 6 Geo. I. c. 18, "enacted," says Blackstone, "in the year after the infamous South-sea project had beggared half the nation," and which public fraud the act was intended to punish. But it was repealed by the 6 Geo. IV. c. 91, which at the same time left such companies to be dealt with by the common law.

**BUBBLE SHELL**. See **BULLA**.

**BUBO**, an inflammatory tumor, seated in the groin or the armpit. See **SYPHILIS**.

**BUBO**. See **OWL**.

**BUCCANEERS**, a celebrated association of piratical adventurers, who, from the commencement of the second quarter of the 16th c., to the end of the 17th, maintained themselves in the Caribbean seas, at first by systematic reprisals on the Spaniards, latterly, by less justifiable and indiscriminate piracy. The name is derived from the Caribbee *boucan*, a term for preserved meat, smoke-dried in a peculiar manner. From this the French adventurers formed the verb *boucaner* and the noun *boucanier*, which was adopted by the English; while, singularly enough, the French used, in preference, the word *flibustier* (see **FILIBUSTER**). a corruption of our "freebooter." The B. were also sometimes called "brethren of the coast." The arrogant assumption by the Spaniards of a divine right—sanctioned by the pope's bull—to the whole new world, was not, of course, to be tolerated by the enterprising mariners of England and France; and the enormous cruelties practiced by them upon all foreign interlopers, of which the history of that time is full, naturally led to an association for mutual defense among the adventurers of all other nations, but particularly among the English and French. The fundamental principles of their policy—for they, in course of time, formed distinct commu-

nities—were close mutual alliance, and mortal war with all that was Spanish. Their simple code of laws bound them to a common participation in the necessities of life; locks and bars were proscribed as an insult to the general honor; and every man had his comrade, who stood by him when alive, and succeeded to his property after his death. The principal center of their wild and predatory life was for some time the island of Tortuga, near St. Domingo. When they were not hunting Spaniards, or being hunted themselves, their chief occupation and means of subsistence was the chase. From the flesh of wild cattle they made their "boucan;" their skins and tallow they sold or bartered to Dutch and other traders. The history of these men embraces, as may be supposed, narratives of cruelty and bloodshed unsurpassed in the annals of crime. It has, however, not a few stories of high and romantic adventure, of chivalrous valor, and brilliant generalship. Among the "great captains" whose names figure most prominently in the records of buccaneering, were the Frenchman Montbars, surnamed by the terrible title of "the exterminator;" his countrymen, Peter of Dieppe, surnamed "the great"—as truly, perhaps, as others so distinguished—and L'Olonnas, Michael de Busco, and Bartolomeo de Portuguez, Mansvelt, and Van Horn. Pre-eminent, however, among them all was the Welshman, Henry Morgan, who organized fleets and armies, took strong fortresses and rich cities, and displayed throughout the bold genius of a born commander. He it was that led the way for the B. to the southern ocean, by his daring march in 1670 across the isthmus of Panama to the city of that name, which he took and plundered after a desperate battle. This brilliant but most unscrupulous personage was knighted by Charles II., and became deputy-governor of Jamaica. A higher subordination of the love of gold to the passion for dominion in him, might probably have made him emperor of the West Indies, some dream of which seems at one time to have occupied his mind. In 1680 and 1689, extensive buccaneering expeditions were made to the Pacific, even as far as the coasts of China, of which the best record is preserved in the lively pages of William Dampier, himself an important partner in these bold adventures. The war between France and Britain, after the accession of William III., dissolved the ancient alliance of the French and English buccaneers. After the peace of Ryswick, and the accession of the Bourbon Philip V. to the Spanish crown (1701), they finally disappeared, to make way for a race of mere cut-throats and vulgar desperadoes, not yet utterly extinct. The last great event in their history was the capture of Carthage in 1697, where the booty was enormous. See the *History of Burney*; Thornbury, *Monarchs of the Main* (1855); Dampier's *Voyages*; *Les Filibustiers au XVII<sup>e</sup> Siècle* (Limoges, 1884); Pyle, *Buccaneers and Marooners* (N. Y. 1891).

**BUCCA'RI**, or BAKAR, a free port of Austrian Croatia, on an inlet of the gulf of Quarnero, 5 m. e.s.s. from Fiume. It is beautifully situated on the slope of a hill, and has a small but very good and safe harbor. The linen manufacture is carried on here, and ship-building is actively prosecuted; but the inhabitants are principally sailors and fishermen. The tunny fishery is the chief fishery of this part of the Adriatic. The vine is extensively cultivated in the neighborhood of B. and good wine is made. Pop. about 2000.

**BUCCINATOR** (from Lat. *buccinare*, to sound a trumpet), the name of a muscle, situated in the substance of the cheeks; it is so called because, when the cheeks are distended with air, the contraction of the B. muscles forces it out.

**BUCCINO**, a t. of s. Italy, in the province of Salerno, pleasantly situated on the Botta, which at this point is crossed by an old Roman bridge, about 14 m. e. from Campagna. In its vicinity are quarries yielding fine marble. Pop. between 6000 and 7000.

**BUCCINUM**. See **WHEEL**.

**BUCCLEUCH**. The Scotts, dukes of B., are one of the oldest and most distinguished families in Scotland. The family traces its descent from sir Richard le Scott, in the reign of Alexander III. (1249-85); but the ancestor who first becomes historically conspicuous is sir Walter Scott of Branzholm and B., a brave and powerful chieftain on the border. B., which from this early period was destined to be associated with the family title, is a lonely estate in the vale of Rankleburn, at the head of Ettrick, Selkirkshire. The sir Walter alluded to flourished in the reign of James V., and on some incidents in his life, his great namesake founded the *Lay of the Last Minstrel*. Sir Walter fought bravely at the battle of Pinkie, 1547, and was slain in an encounter with sir Walter Kerr of Cessford in the streets of Edinburgh, 1552. He was succeeded by his grandson, sir Walter Scott of B., a knight "wise, true, and modest," who was succeeded by his only son, who bore the same name. This sir Walter is celebrated for his military exploits on the border, not the least daring of his enterprises being the rescue of one of his attendants, Kinmont Willie, from the castle of Carlisle. (See *Minstrelsy of the Scottish Border*.) For his services to the state, in which is to be reckoned his carrying away of large numbers of the border marauders to foreign wars, he was raised to the peerage, 1606, as lord Scott of Buccleuch. Dying in 1611, he was succeeded by his only son, Walter, who, in 1619, received an elevation in the peerage, as lord Whitcheater and Eskdale, and earl of Buccleuch. Through his son Francis, the second earl, the family, by a grant, acquired the extensive domain of Liddesdale, formerly belonging to the house of Bothwell; also, by purchase, large territories in Eskdale; and in 1642, the barony of Dalkeith from the

**Morton family.** Francis left only two daughters, the eldest of whom dying without issue, the titles and estates went to her sister, Anne, who, in 1663, was married to James, duke of Monmouth, an illegitimate son of Charles II. In 1673, this pair were created duke and duchess of B., earl and countess of Dalkeith, etc. After a marriage of twenty-two years, the unhappy duke, on a charge of rebellion, was tried and beheaded. 1685; the duchess, however, retaining her honors, title, and estates, as in her own right. The duke left a family of four sons and two daughters. The duchess afterwards married Lord Cornwallis, by whom she had a son and two daughters, and died in 1732, at Dalkeith house, where she had occasionally resided in princely splendor. James, her eldest surviving son, pre-deceased his mother, and his son, Francis, by the death of his grandmother, succeeded to the title of duke of Buccleuch. Notwithstanding the connection with the son of Charles II., the family still preserved the surname of Scott. Duke Francis, in 1748, obtained a restoration of his grandfather Monmouth's earldom of Doncaster and barony of Tynedale, and was hence a British peer. In 1720, he married a daughter of James, second duke of Queensberry, and by this fortunate connection, a portion of the Queensberry estates, along with the dukedom, merged in the family of B. in 1810. Henry, third duke of B., born in 1746, was the greatest and most estimable of his family. He had for his tutor and friend Dr. Adam Smith, and his beneficent talents were directed towards the improvement of his extensive estates in the south of Scotland. The amelioration of the soil, the planting of trees, the making of roads, the improving of the breed of sheep, and the social elevation of his numerous tenantry, uniformly engaged his attention. He died in 1812, and was succeeded by his eldest son, Charles, fourth duke, who, dying in 1814, was succeeded by his son, Walter Francis, born 1806, who bore the title of duke of B. and Queensberry, marquis of Dumfriesshire, etc., in the peerage of Scotland; and earl of Doncaster, etc., in the peerage of England. The duke, like his grandfather, was noted for the improvement of his estates, which in Scotland are situated in Mid-Lothian, Dumfriesshire, Roxburghshire, Selkirkshire, Peeblesshire, Lanarkshire, and stewartry of Kirkcudbright; his farms everywhere being noted for their good steadings and thriving tenantry. As an heritor, the number of churches and school-houses which the duke was concerned in building is very considerable. He had one small possession in Fife—the island of Inchkeith (q. v.). The greatest public improvement ever executed in Scotland by an individual at his own private cost, was carried out by the duke of B. at vast expense. We allude to the creation of the deep-water harbor and port of Granton, on the firth of Forth, 2 m. from Edinburgh. The duke of B. was one of the chief patrons of church livings in Scotland, but waived all claim to compensation when patronage was abolished in 1874. He was lord-lieutenant of Mid-Lothian and Roxburghshire, and captain of the Queen's bodyguard in Scotland. He died in 1884 and was succeeded in the title by his son William Henry Walter, b. 1831.

**BUCCENTAUR**, the name of a ship which acquired much celebrity in Venice at a time when that state was a flourishing republic. A B. was known as early as the end of the 12th c.; and a vessel of the same name was burnt when the French took Venice more than six centuries afterwards; but it is not certain whether this was the same vessel, maintained by being repeatedly patched up with new ribs and planking. The B. is described as having been a galley, about 100 ft. long by 21 in extreme breadth; on a lower deck were 83 banks or rows of oars, manned by 168 rowers; and on an upper deck was accommodation for the illustrious visitors who occasionally came on board. The whole of the fittings were of the most gorgeous character. Although propelled mainly by oars, there were 40 mariners employed in other ways to manage the galley. The B. was employed only once a year, when the doge "married the Adriatic." A splendid water-procession was formed, with the doge and the chief notables in the B., and other distinguished persons in gondolas and feluccas; and when the vessels arrived at the mouth of one of the channels opening into the Adriatic, the doge dropped a ring into the water, using the words: "We wed thee with this ring in token of our true and perpetual sovereignty." This singular ceremony, which took place on Ascension day, arose out of an honor or privilege conferred by the pope on the doge in 1177, consequent on a splendid victory gained by the Venetians over the emperor Frederick Barbarossa.

**BUCEPHALUS** (Gr. meaning "ox-head"), the name of the favorite charger of Alexander the great, was probably also the name of a peculiar breed of horses in Thessaly. According to tradition, Alexander in his boyhood was the first to break in the steed B., and thus fulfilled the condition stated by an oracle as necessary for gaining the crown of Macedonia.—The town **BUCEPHALIA**, on the river Hydaspes, in India, was founded near the grave of B. which died during Alexander's Indian expedition.

**BUCEP, MARTIN**, one of the church reformers of the 16th c., was b. 1491, at Schlettstadt in Alsace. His real name was *Kuhhorn* (cow-horn), but in accordance with the fashion of his time among scholars, he changed it into its Greek equivalent, Bucer being derived from *bous*, an ox, and *keras*, a horn. At the age of 14 he entered the order of Dominicans. At the suggestion of his superior, he went to Heidelberg to study theology, devoting his attention, however, at the same time to the Greek and Hebrew languages. While young L. was appointed chaplain to the elector of the palatinate. An acquaintance with the works of Erasmus had already inclined B. toward Protestantism.

and his views were confirmed by the influence of Luther at the Heidelberg disputations in 1518. Following the example given by Luther at the diet of Worms (1521), B. became one of the boldest and most decided of the German reformers. In 1523, he went to Strasburg, where he introduced the doctrines of the reformation. In the disputes between Luther and Zwingli, he adopted a middle course, and endeavored to make reconciliation between them; but his view of the sacraments, which approached that of Zwingli, exposed him to Luther's harsh reprobation. At the diet of Augsburg, where he conducted himself with great circumspection and moderation, he generally accorded with the Lutheran views; but, along with other Strasburg theologians, declined to subscribe to the proposed confession of faith, and afterwards drew up the *Confessio Tetrapolitana*. An agreement, however, was subsequently entered into between B. and the Lutherans, and as a disciple of Luther, he appeared at the religious conference of the reformers held at Leipsic. In consequence of his refusal to sign the *Interim*—a temporary creed drawn up by order of the emperor Charles V.—B. found his situation irksome in Germany, and therefore accepted the invitation of archbishop Cranmer (1549), and came to England to teach theology at Cambridge, and assist Paul Fagius and others in forwarding the reformation. His modesty, blameless life, and great learning gained many friends in England; but his labors were soon interrupted by death, Feb. 27, 1551. His remains were interred in a church at Cambridge with great solemnity; but during the reign of Mary, his bones, with those of Fagius, were taken from their graves and burned in the market-place. His constant attempts to express himself in language agreeable both to Luther and Zwingli, induced in him at times an obscure, ambiguous, and elusive kind of thought, to which, perhaps, Bossuet refers when he stigmatizes B. as "the great architect of subtleties." The religious passions of the time prevented his contemporaries from forming a fair estimate of his character. By some Protestant writers he is ranked as a theologian above even Luther and Melancthon. His best work is a translation and exposition of the Psalms, which he published under the pseudonym Aretinus Felinus (Strasburg, 1529). Hubert intended to edit the whole of B.'s writings in ten volumes, but only one volume appeared (Basel, 1577). See Baum, *Capito und Bucser* (1860), and Tollin, *Servet und Bucser* (1880).

**BU' CEROS.** See HORNBILL.

**BUCH, LEOPOLD VON**, one of the most celebrated of German geologists, was b. at Stolpe, in Prussia, April 20, 1774, and received instruction under Werner at the mining academy, Freiburg. He afterwards traveled in pursuit of his favorite science, through all the states of Germany, through Scandinavia, as far as the North cape, and through several parts of Great Britain, France, and Italy, visiting the Canary islands in 1815. His chief writings are—*Geological Observations during Travels in Germany and Italy* (1802–1809); a *Physical Description of the Canary Islands* (1825); *Travels in Norway and Lapland* (1810); and essays *On the Jura in Germany* (1839); and *On the Mountain Systems of Russia* (1840), with several monographs on Ammonites (1832) and other fossils. He was also the author of an excellent geological chart of Germany and its neighboring states, published in 42 plates (2d ed., Berlin, 1832). He died in Berlin, Mar. 4, 1853. B. has been described by an eminent scientific man as "the only geologist who has attained an equal fame in the physical, the descriptive, and the natural history departments of his science. In all these he has been an originator and a discoverer."

**BUCHAN, the n.e. district of Aberdeenshire**, consisting of about a fourth of the county, lying between the Ytham and the Doveran. Its surface is undulating, the highest points being Mormond hill in the n., 742 ft., and Dudwick hill in the s., 562 feet. Portions of the coast are bold and precipitous, especially for a few m. e. of the Doveran mouth, where Troup head is 600 ft. high, and s. of Peterhead, where the coasts rise from 70 to 100 feet. Among the rocks five m. s. of this town are the famous Bulters of B., a huge vertical well in the granite margin of the sea, 50 ft. diameter, and 100 ft. deep, into the bottom of which the sea rushes by a natural archway, and, in storms, dashes up the sides with great violence. The eastern parts of B. consist chiefly of granite and gneiss, and the western of clay-slate and old red sandstone. The chief seats of population are Peterhead, Fraserburg, Macduff, and Turriff. B. contains several so-called Druid circles, as well as the remains of the abbey of Deer, and of several castles belonging to the Comyns, who held the earldom of B., but forfeited their title and property in 1309.

**BUCHAN, DAVID**, 1780–abt. 1837; an officer in the British navy who spent many years in explorations in the north polar seas. In 1810 he commanded a schooner on the Newfoundland station, and made a trip up the river of Exploits, the largest stream in Newfoundland. In 1818, he commanded an arctic expedition for the discovery of the north pole. He reached 80° 34', but was caught in the ice and drifted about between Greenland and Spitzbergen until his vessel was disabled, when he managed to return to England. In 1823, he was commander on the Newfoundland station, and in 1825 high-sheriff of the colony. A few years later he sailed again for the arctic seas, and was never afterwards heard from. He made many important scientific observations concerning the variation of the needle and ocean currents.

**BUCHANAN**, a co. in n.e. Iowa, watered by tributaries of the Red Cedar river; 576 sq. m.; pop. '70, 17,094; in '90, 18,997. It is tolerably level and well timbered. The Illinois Central railroad traverses the co. near the central portion. Productions chiefly agricultural. Co. seat, Independence.

**BUCHANAN**, a co. in n.w. Missouri, on the Missouri river; 420 sq. m.; pop. '90, 70,100 incl. colored. Eight main and branch railroads traverse the county. The soil is fertile; productions chiefly agricultural. Co. seat, St. Joseph.

**BUCHANAN**, a co. in s.w. Virginia, on the Kentucky border, bounded n.w. by the Cumberland mountains; 440 sq. m.; pop. '70, 3777; in '90, 5867. The surface is rough and much of it mountainous. Agriculture is the chief occupation. Co. seat, Grundy.

**BUCHANAN, FRANKLIN**, b. Md., Sept. 17, 1800; a midshipman in 1815, and in 1845 the first superintendent of the U. S. naval academy. In 1855 he was made a capt., and in 1861 had command of the Washington navy-yard. He resigned when the civil war broke out, but as his state did not leave the union, he asked to be restored. This was refused, and he went over to the confederates, having command of the *Merrimac* in the attack upon the union fleet in Hampton Roads, in which engagement he was wounded. In August, 1864, as admiral, he commanded the confederate fleet so thoroughly defeated by Farragut in Mobile bay. On that occasion he lost a leg and was taken prisoner, but was released when the war closed. He was subsequently president of the Maryland Agricultural College, and still later an insurance agent. He d. 1874.

**BUCHANAN, GEORGE**, one of the most learned men of the 16th c., and a distinguished poet and historian, was b. of poor parents in Killearn, in the co. of Stirling, in Feb., 1506. He was sent to the university of Paris by his uncle, who died two years afterwards, leaving B. without the means of prosecuting his studies. He returned home, served in one campaign against the English, and entered St. Andrews university in 1524, where, in the following year, he took his degree of B.A. In 1526, he went to Paris, and became a student in the Scots college there. He subsequently obtained a professorship in the college of St. Barbe, but returned to Scotland about 1537. During his residence on the continent, B. adopted the tenets of the reformed faith. A satire entitled *Somnium*, exposing the Franciscans, brought down upon him the wrath of the priests; and he had resolved upon seeking safety in his old college at Paris, when king James V. took him under his protection, and intrusted him with the education of one of his illegitimate sons. At the request of the king, B. wrote another and more pungent satire against the monks, entitled *Franciscanus*, increasing their anger, and rousing especially the bitter hatred of the powerful cardinal Beaton, who after a time procured B.'s arrest, and even went so far as to offer the king money for his life. Though to James was entirely due the publication of the offensive satire, he did not interfere to protect the poet, who, however, contrived to effect his escape to Paris. After spending some years at Bordeaux and Paris in tuition, he accompanied the learned Portuguese, Govea, to the university of Coimbra, in Portugal, as one of his associates. After the death of Govea, B. was arrested as a heretic, and was for some time detained in a monastery, where he began his splendid Latin metrical version of the Psalms. In 1551, being restored to liberty, he went to England; but soon afterwards went to Paris. About 1560, he returned to Scotland, where he made an open confession of Protestantism. His reputation as a scholar gained for him a good reception at the court of the young queen, Mary, whose classical tutor he became. But his religious and political principles attached him to the party of the regent Moray, by whose influence he was appointed principal of St. Leonard's college, in St. Andrews university, in 1566. In the following year, he was chosen moderator of the general assembly—a very high honor for a layman. The doings of Mary, which scandalized the Scottish public, disgusted her tutor also, and he accompanied the regent Moray to England, in order to give evidence against her before the commissioners appointed by Elizabeth to inquire into her guilt. His *Detectio Mariæ Regina*, laid before these functionaries, was industriously circulated by the English court. In 1570, B. was appointed tutor to the young king, James VI. (afterwards James I.), who owed to him all the erudition of which in later life he was so vain. No considerations of the future position of his pupil were allowed to interfere with B.'s treatment of him, which was strict, if not even stern; and in dedicating his *De Jure Regni apud Scotos* to the young monarch in 1579, he warned him against favorites with a freedom remarkable not only in a subservient but in any age. In 1570, B. was appointed director of chancery, which he soon resigned, and in the same year was made keeper of the privy seal, an office which he retained until within a short time of his death. The latter years of his life were devoted to the composition of his *History of Scotland* (published in 1582). He died thirty days after his publication, on the 28th Sept., 1582, and was buried in Greyfriars churchyard, Edinburgh. As a scholar, B. was unrivaled in his age; and he wrote Latin poetry "with the purity and elegance of an ancient Roman." He was alike humorous, sarcastic, and profound. His *History*, written in Latin, is remarkable for the richness, force, and perspicuity of its style, though it has been found fault with for the partiality of its narration of contemporary events; and two years after the author's death, it, as



well as *De Jure Regni*, etc., was condemned by the Scottish parliament, and every person possessed of copies was ordered to surrender them within 40 days, in order that they might be purged of "the offensive and extraordinary matters" they contained. Two collected editions of B.'s works have been published—one by Ruddiman in 1715, 2 vols. folio; and another by Burman, Leyden, in 2 vols. quarto, in 1725. The translations that have yet appeared are far from doing justice to the original.

**BUCHANAN, JAMES**, the fifteenth elected president of the United States, filling the 18th presidential term (1857-61); b. at Stony Batter, Franklin co., Penn., April 23, 1791; d. Lancaster, Penn., June 1, 1868. He was the son of an Irish emigrant and an American mother, educated at Dickinson college, bred to the law, and admitted to practice in 1812. Though a professed federalist, he served as a private in the war with England. In 1814, he was a member of the Pennsylvania legislature, and in 1820 was elected to congress, where he served through five terms. In 1823, he favored Jackson for president, and in the congress of 1829-31 was chairman of the committee on the judiciary. After leaving congress, Jackson sent him as minister to Russia, where he concluded the first commercial treaty between the two countries, securing valuable privileges in the Black and Baltic seas. In 1833, he was chosen to the United States senate, where he supported Jackson, especially in the claim that appointments might be made by the president alone when the senate was not in session. When it was proposed to exclude from congress petitions for the abolition of slavery, B. desired to prevent even the discussion of slavery by congress, proposing to leave the matter solely to the slaveholding states, and holding that congress had no power over it. He favored the recognition of Texan independence, and the annexation of that republic to the United States. In the affair of the French indemnity, he supported Jackson's demand for payment or war. During Van Buren's administration Buchanan supported the independent treasury scheme; favored the pre-emption of public lands, and opposed the bill to prevent the interference of federal officers in elections. He sustained the veto power under Tyler, and opposed the ratification of the Ashburton treaty, which settled the dispute concerning the northern boundary. When the question of the annexation of Texas came to the senate there were but 15 votes in its favor, but the measure was carried in the form of joint resolutions only three days before the close of the term of congress. B. was the only member of the senate committee of foreign affairs to report in favor of annexation. Polk made him secretary of state. In this position he had to deal with the north-western boundary question, whence arose the famous partisan cry "54° 40' or fight." Both England and the United States had formally claimed the territory between the Pacific coast and the Rocky mountains up to the Russian boundary, but after much negotiation the line of 49° n. lat. was agreed upon. During the war with Mexico, B. was busy in avoiding or preventing the interference of other nations. He was in private life during the discussion and adoption of the compromise measures of 1850, but fully approved them. When Pierce came into office in 1853, he sent B. as minister to Great Britain, where he was engaged in endeavors to settle a series of questions concerning Central American affairs. In the course of these duties he was present at the Ostend conference, the object of which was to bring about the sale of Cuba to the United States; but nothing resulted beyond talk. In April, 1856, B. returned to the United States, and in June was nominated for president by the democratic party. The electoral vote was: for Buchanan, 174; for John C. Fremont (candidate of the newly organized republican party), 114; for Millard Fillmore (native-American), 8. The popular vote was: Buchanan, 1,838,169; Fremont, 1,341,264; Fillmore, 874,538; majority against Buchanan, 377,633; plurality for him, 496,905. He had the votes of every slaveholding state except Maryland, which went alone for Fillmore. The vote for Fillmore also gave Buchanan California and New Jersey. In the executive chair his effort was to smother and put out of sight the agitation concerning slavery not only in new states, but everywhere. Among other acts of his administration was the temporary pacification of the Mormon troubles, and the vetoing of the homestead bill. After Lincoln's election, B. was more than ever anxious to suppress the slavery discussion, and pointedly accused the north, in his last message to congress, as to blame for the impending disorder, because of that discussion, which had "produced its malign influence on the slaves, and inspired them with a vague idea of freedom." While holding that the executive ought to take care that the laws be faithfully executed, he shrank before the secession of South Carolina, declaring that he could not employ force except upon the demand of the lawful authorities of the state, and in South Carolina no such authority then existed. His argument was that, if a state had withdrawn, or was even attempting to withdraw, from the union, there was no power in the constitution to prevent the act. A few days later he was confronted by commissioners from South Carolina (that state having passed an act of secession on the 20th Dec., 1860), who came to demand the surrender by the president to the seceded state of all public property, and to negotiate for the continuance of "peace and amity between that commonwealth and the government at Washington." His reply was that he had no power, and could only refer the matter to congress; he could only receive them as "private gentlemen of the highest character," and treat respectfully such propositions as they might make. He did, however, decline to accede to their demand for the removal of the troops from Charleston harbor. The cabinet immediately broke up. Gen. Cass was secretary of state, but resigned when the president refused to order reinforce-

ments to the Charleston ports; the secretary of the treasury and the secretary of the interior had already gone; Floyd, secretary of war, resigned because the president refused to withdraw the troops. The last official act of President Buchanan of any importance was characteristic of his whole course where the south and its institutions were concerned. It was embodied in a letter from the secretary of war (Holt) to the governor of South Carolina (Jan. 15, 1861), which declared, "by order of the president," that "the forts in that state, in common with the other forts, arsenals, and property of the United States, are in charge of the president, and that if assailed, no matter from what quarter or under what pretext, it is his duty to protect them by all the means which the law has placed at his disposal," adding that it was not his present purpose to garrison the forts, as he "considered them entirely safe under the protection of the law-abiding sentiment for which the people of South Carolina had ever been distinguished; but should they be attacked or menaced with danger of being seized or taken from the possession of the United States, he could not escape from his constitutional obligations to defend and preserve them." After the installment of his successor, B. retired altogether from public affairs, but a year or two after the close of the civil war, he published a defense of his administration and the measures he adopted for the preservation of peace. He was never married. See *Life* by George Ticknor Curtis (2 vols., N. Y., 1888).

**BUCHANAN, ROBERT CHRISTIE**, 1810-78; b. Md. graduate of West Point, 1830, served meritoriously in the Black Hawk, Seminole and Mexican wars; was made brevet lieutenant-col. after the battle of Molino del Rey; was lieutenant-col., Fourth Infantry, in the army of the Potomac during the peninsular campaign; brevet col., June, 1862; brig.-gen., volunteers, Nov., 1862; col., First Infantry, Feb., 1864, commanding at New Orleans, Dec., 1864-Aug., 1865; brevet brig.-gen. U. S. A., Mch., 1865; brevet maj.-gen., the same year, and retired from service, Dec. 31, 1870.

**BUCHANAN, ROBERT WILLIAMS**, b. 1841; a poet of Scotland, educated at Glasgow university. In 1860 he published *Undertones*, a volume of verses; in 1865, *Idylls and London Poems*. In the same year he edited *Wayside Posies*, and translated ballads from the Danish. Among later works are *Napoleon Fallen—a Lyrical Drama*; *The Land of Lorne, including the Cruise of the Fern to the Outer Hebrides*; *The Drama of Kings*; *On the Fleshly School of Poetry* (a severe criticism of some living English poets); *Master Spirits*; *A Mad Prince* (acted at the Haymarket); *The City of Dreams* (1888); *The Wandering Jew* (1898); *Diana's Hunting* (1896), etc.

**BUCHANITES**, an extraordinary sect of fanatics, which sprang up in the w. of Scotland in 1798, but has now become extinct. The founder of the sect was Mrs. or Lucky Buchan, b. in Banffshire in 1738, of humble parentage. Her maiden name was Elspeth Simpson. She early fell into habits of vice, but with her licentiousness were combined a sort of religious fervor and extreme antinomian opinions. In 1792, being resident in Glasgow with her husband, a potter, who ultimately divorced her, she became acquainted with the Rev. Hugh White, minister of the Relief congregation in Irvine, a weak vain man and coarse declamatory preacher, who adopted her opinions, for which he was deposed by his presbytery, and began along with her to found a new sect in Irvine. Popular tumults arose, which led to her expulsion from the town in May, 1794. Mr. White and his wife, with other devoted adherents, male and female, accompanied her, regarding her as a divinely commissioned person, and expecting her to lead them to the place where Christ was speedily to appear again on earth. The sect became extinct in 1846.

**BUCHAREST', BUKHAREST', or BUKHOREST'**, the chief city of Wallachia, and capital of Roumania, in a rich and extensive plain on the Dumbovitzza, a tributary of the Arghish, in lat. 44° 26' n., and long. 26° 5' east. The town is for the most part meanly built, and the streets are very irregular and generally unpaved. There are, however, some handsome hotels; and the churches are numerous and many-spired, giving to the place a picturesque appearance. The prince's palace, a large structure in the center of the town, has no claim to architectural beauty. The number of cafés and gambling-tables is excessive; and altogether B. has the unenviable reputation of being the most dissolute capital in Europe. The *corso*, or public promenade, is a miniature Hyde Park. B. is the entrepôt for the trade between Turkey and Austria, the chief articles of commerce being grain, wool, salt, honey, wax, building-timber, and cattle. It has some small manufactures of woollen cloths and carpets. B. has at various times suffered considerably at the hands of the Russians, and is remarkable as the place where in 1812 a treaty was concluded between Turkey and Russia, by which the former ceded to the latter the province of Bessarabia and a portion of Moldavia; Russia waiving her claim to all other territories she had conquered. This treaty also defined the Pruth as the boundary-line between the two empires. Pop. 1894, estimated 232,000.

**BUCHER**, an unorganized co. in s.w. Tex.; drained by the San Francisco river, and intersected by the Southern Pacific railroad; area, 1440 sq. m.; pop. '90, 307.

**BÜCHELER, FRANZ**, German philologist, as renowned for his great learning, especially in grammar and epigraphy, as for his discriminating talent in criticism and his brilliant work as an academic instructor, was born at Rheinberg in 1837. He studied at Bonn, became professor in Freiburg in 1858, at Greifswald in 1866, and in 1870 returned to Bonn. His investigations in the department of ancient Italian dialects are very valuable. Especially important is his *Grundriss der lateinischen Deklination* (a new edition by Windekilde, with the admirable additions of the French translator, Haret, in 1879).

Some years previously he prepared a Latin grammar, treating exhaustively of sound and inflection. His *collectanea*, as well as his editions of various writers, give evidence of his genius for critical texts.

**BUCHHOLTZ, REINHOLD**, 1836-76; b. Germany. He was educated in the gymnasium of Königsberg, the Joachimsthal gymnasium of Berlin, and the medical departments of Greifswald and Berlin universities. After practicing a short time at Greifswald, he gave up medicine for zoology, and spent some time in Italy, studying marine life. He accompanied the North-Pole expedition of the Hansa, and wrote several articles on this subject. He was soon after made prof. in Greifswald university. He made an unsuccessful attempt, 1872, to explore the mouths of the Niger. In recognition of his services to science he was made, 1876, prof. ordinary at Greifswald.

**BUCHNER, FRIEDRICH KARL CHRISTIAN LUDWIG**, b. 1824; a German atheistic philosopher. He was a practicing physician, in the school of Tübingen, whence he was removed because of his publication of the doctrine that nothing beyond material force is known to man (published in English as *Force and Matter*). The main ideas of his doctrines are the eternity of matter, the indestructibility of force, the co-existence of light and life, and the infinity of forms of being. *Licht und Leben* was published, '82.

**BUCHNER, MAX**, explorer, b. in Hamburg, Germany, April 26, 1846; made his first expedition to Africa in 1878; aided in the annexation of Togoland and Kamerun to the German possessions in 1884; became curator of the ethnologic museum of Munich; and made an exploring journey to Australia and New Guinea in 1888-90.

**BUCHTEL COLLEGE** is situated in the city of Akron, Summit County, Ohio. It was founded by the Universalist State Convention of Ohio, and named in honor of John R. Buchtel, its most liberal benefactor. It was opened to students of both sexes Sept. 11, 1872. There are three four years' courses of study—the classical, the philosophical, and the scientific. All studies are elective after the first term of the sophomore year. There is also a preparatory course for each of the college courses, carried on by separate teachers. There are 50 perpetual scholarships of one thousand dollars each intended to aid worthy and deserving students. While under the control of a denomination its liberal spirit causes it to welcome students of all religious beliefs and, as a matter of fact, half its students are from various denominations other than Universalists. In 1897 it employed sixteen teachers and had enrolled two hundred students.

**BUCHU**. See **BUCKU**.

**BUCK**, a name sometimes distinctively appropriated to the male of the fallow deer (q. v.), the female of which is a *doe*. But the term B. is often also applied to the male of other species of deer, as of the roebuck, although never to that of the red deer (see **DEER**), which, when mature, is a **STAG** or a **HART**.

**BUCK, DUDLEY**, b. Hartford, Conn., 1839. A commercial career was chosen for him, but he early showed such aptitude for music that his father allowed him to leave college, 1858, in order to prosecute his musical studies at the Leipzig conservatory. Returning to the U. S., 1862, he soon became noted as a musical leader, composer, and organist. He furnished the music for Lanier's cantata, sung at the opening of the Centennial exhibition, Philadelphia, 1876, and gained the prize of \$1000, offered by the Cincinnati Musical festival of 1880 for the best cantata, choosing Longfellow's *Golden Legend* as his text. He published *The Story of the Cross*, a cantata, in 1891.

**BUCKAU**, a t. in Saxony on the Elbe, adjoining Magdeburg; pop. '85, 16,049. It has extensive machine works, and several important manufactories.

**BUCKBEAN**, or **MARSH TREFOIL** (*Menyanthes trifoliata*), a plant of the natural order *gentianaceae* (q. v.), the only known species of its genus, widely distributed in all the colder parts of the northern hemisphere, and common in America. It has been described as "perhaps the most beautiful" of all British plants. It grows in marshy places, its creeping root-stalks (or rhizomes) and densely matted roots often rendering boggy ground firm. The leaves are ternate, like those of the trefoils or clovers, and are supported on pretty long stalks. The flower-stalk bears a compound raceme of 10 to 20 white flowers, externally tipped with red. The calyx is 5-parted; the corolla funnel-shaped, with a spreading 5-lobed limb, shaggy on the inner surface, with thick fleshy hairs. The fruit is a one-celled, two-valved capsule. The leaves are destitute of smell, but very bitter. From them is prepared a valuable bitter extract, which has long been used in cases of dyspepsia and disorders of the bowels, and which was also formerly employed in intermittent fevers. An infusion is also sometimes used, and sometimes the dried and powdered leaves. The whole plant seems to possess the same bitter and tonic properties. It is sometimes used in Germany as a substitute for hops. The root-stock, however, which is black and jointed, contains a considerable quantity of a kind of starch.

**BUCKBOARD**. A four-wheeled vehicle in which a long elastic board or platform is used in place of the ordinary body, springs, and gear. It is fixed as a connection between the fore and rear axles, and may have one or more seats. It is thus the most simply constructed of any four-wheeled vehicle. Buckboards were first used only in mountain districts where the roads are rugged, and were for a long time rudely and simply built. When the Adirondack region and Mount Desert became fashionable resorts, the summer visitors to these places had the primitive buckboards reproduced in

more elegant form by carriage builders, so that the buckboard now usually seen differs greatly from the model, being made in handsome woods of a light color, ash or hickory, with springs, silver mountings, and cushions of russet leather, and costing from \$100 to \$500.

**BUCKEYE.** See HORSE CHESTNUT.

**BUCKEYE STATE.** See STATES, POPULAR NAMES OF.

**BUCK-HOUND**, a hunting-dog once common in Britain, when buck-hunting was a most fashionable amusement, but of which few packs now exist. The buck-hound resembles a dwarf STAG-HOUND (q.v.), and possesses great strength and perseverance. Bucks are, however, often hunted by other kinds of hounds.

**BUCKINGHAM**, a co. in central Virginia on the James and Appomattox rivers, traversed by the James canal. Area, 628 sq.m.; pop. '90, 14,628, half colored. There is a gold mine near Willis mountain, and iron and slate are found. Co. seat, Buckingham.

**BUCKINGHAM**, the old co. t. of Buckinghamshire, in the n. part of the shire, is situated on the Ouse—which flows round the town, and has three bridges. B. is 61 m. n. w. of London by rail. Till 1885 it sent one member to parliament. Pop. '91, 3364. It was formerly an important seat of the bobbin lace manufacture, but this industry has declined. B. is a place of considerable antiquity. Edward the elder fortified it in 978, and the Danes captured it in 1010. The earls of Buckingham built a castle here soon after the Norman conquest. Edward III. made it a staple for wool. Here Catharine of Aragon received the news of the battle of Flodden, and Charles I. had his head-quarters in B. for a few days in 1644.

**BUCKINGHAM**, Duke of; **GEORGE VILLIERS**, the favorite of James I. and Charles I. of England, third son of sir George Villiers, was born at his father's seat of Brooksby, Leicestershire, Aug. 20, 1602. Knighted in April, 1616, and sworn a gentleman of the bed-chamber on Jan. 1, 1617, he became master of the horse and a knight of the garter. Created the same year baron of Whaddon and viscount Villiers, and in Jan. following earl of B. and sworn of the privy-council, he was next made a marquis, and appointed lord-admiral of England, chief-justice in Eyre of parks and forests s. of the Trent, master of the king's bench office, high steward of Westminster, and constable of Windsor castle. In 1620, he married the daughter of the earl of Rutland, the richest heiress in the kingdom. In 1623, while negotiations were in progress with the Spanish court for a marriage between the infants and the prince of Wales, afterwards Charles I., B. persuaded the latter to go himself to Madrid and prosecute his suit in person. The ultimate failure of the negotiations has been ascribed to B.'s arrogance. In his absence he was created a duke, and on his return nominated lord-warden of the Cinque Ports, and steward of the manor of Hampton court. By his advice, James declared war against Spain. On the accession of Charles I., in 1625, B. maintained his ascendancy at court, but after the ill-fated expedition against Cadiz, he became odious to the nation, and was saved from impeachment only by the king's dissolving parliament. The treaty for the marriage of Charles with the princess Henrietta of France was concluded by him, but he was not allowed to return to Paris, in consequence of his audacity in lifting his eyes to the French queen. In 1627, with an armament of 100 sail and 7000 soldiers, he appeared before Rochelle, then in possession of the Huguenots, who refused him admission within the harbor. His troops then made an ill-conducted descent on the neighboring isle of Rhé, and returned to England beaten and disgraced. He soon after undertook a second expedition to Rochelle, and proceeded to Portsmouth for embarkation, when he was assassinated by a discontented subaltern-officer, named Felton, Aug. 28, 1628, in his 36th year.

**BUCKINGHAM**, 2d Duke of (**GEORGE VILLIERS**), a brilliant but profligate nobleman, son of the preceding, was b. at Wallingford house, Westminster, Jan. 30, 1627, and studied at Cambridge. On the outbreak of the civil wars, he served in the royal army; his estates were confiscated by the parliament, and he took refuge on the continent. He attended Charles II. into Scotland, and after the battle of Worcester, in 1651, went again into exile. Returning secretly into England, he married, in 1657, the daughter of lord Fairfax, the parliamentary general, to whom his forfeited estates had been assigned. Arrested by Cromwell, and committed to the Tower, he was afterwards removed to Windsor castle, but released on the abdication of Richard Cromwell. At the restoration, he recovered his estates, and was made master of the horse, and sworn of the privy-council. He was mainly instrumental in the fall of the chancellor, Clarendon, whom he made an object of ridicule to the king, and was one of Charles's confidential ministers, who, from the initial letters of their titles, were called "the Cabal." Engaging in 1666 in some treasonable practices for effecting a change in the government, he was deprived of all his offices at court, but, on his submission, soon recovered them. In 1670, he was sent ambassador to France, and was employed on some other embassies. He was elected chancellor of the university of Cambridge in 1671. Supporting the non-conformists in 1674, he opposed the test act, and was deeply engaged in the popish plot. After Charles's death, in 1685, B. retired to his manor of Helmsley, in Yorkshire, and amused himself with the chase. He died at Kirkby-Moorside, April 16, 1688, and was

interred in Westminster abbey. The manufacture of glass and crystal is said to have been introduced into England from Venice by him. B. was the author of several stage-plays, of which the best is *The Rehearsal*, a comedy; *A Satire against Mankind*; and some poems.

**BUCKINGHAM, JAMES SILK**, an English traveler and popular lecturer, son of a farmer, b. in 1786, at Flushing, near Falmouth, Cornwall; when a boy, went to sea, and made several voyages to Lisbon. After years of unsettled and wandering life, he, in 1816, established a journal at Calcutta, but the boldness of his censures on the Indian government led to his expulsion from the presidency of Bengal. His lectures, on his return to England, against the East India company monopoly, and in support of opening the trade to China, tended greatly to direct public attention to the subject. In London, he established *The Oriental Herald*, and *The Athenæum*, now the leading weekly literary journal. Subsequently, he traveled through the United States, and from 1832 to 1837 was M.P. for Sheffield. He was projector and secretary of the British and foreign institute, literary club, 1848-1846; and president of the London Temperance League, 1851. B. was the author of numerous works of travel on the continent, in the east, and in America. He was engaged on his autobiography, two volumes of which were published before his death, which took place June 30, 1855.

**BUCKINGHAM, JOSEPH TINKER**, 1779-1861; an American journalist, native of Connecticut. He was bred a printer, and in 1800 went to Boston, where, six years later, he began *The Polyanthus*, a monthly magazine, which was soon suspended, but resumed in 1812. In 1809, he published a weekly called *The Ordeal*; from 1817 to 1828, *The New England Galaxy and Masonic Magazine*; and, in 1831, *The New England Magazine*. In 1824, he started the *Boston Courier*, of which he was editor until 1848. On the 24th of June, 1840, he presided over the celebration (in Boston) of the four hundredth anniversary of the invention of printing. As an editor he was a vigorous writer, but rather bitter and personal. He was several times elected to the legislature. Besides his ordinary work, he published *Specimens of Newspaper Literature, with Personal Memoirs, Anecdotes, and Reminiscences*, and *Personal Memoirs and Recollections of Editorial Life*.

**BUCKINGHAM, WILLIAM ALFRED**, LL.D., 1804-75; the "war governor" of Connecticut (1858-66), noted for his zeal and untiring energy in support of the union cause during the civil war. Before his election as governor he was a carpet manufacturer and merchant. In 1869 he was elected U. S. senator. Among his benefactions was \$25,000 to the Yale theological seminary. The capitol at Hartford has a statue of him.

**BUCKINGHAM, OR BUCKINGHAMSHIRE, JOHN SHEFFIELD**, Duke of; 1649-1721; son of the second earl of Mulgrave. In the war with Holland, he served in the navy and commanded a ship; and afterwards, in the land forces, he joined Turenne to study the art of war. James II. made him lord chamberlain and one of the privy council. He acquiesced in the revolution and was in the cabinet of William III.; and, on the accession of Anne, with whom he was a personal favorite, he received the privy seal and became lord lieutenant of the North Riding of Yorkshire. He sided with the tories, and held last the dignity of lord president. He wrote two tragedies, and an essay on poetry, and one on satire.

**BUCKINGHAMSHIRE**, a south-midland county of England, its greatest length being about 54 m., its average breadth 18, and total area 743 sq. miles. The plastic clay tertiary strata occupy the southern parts of the county, which is finely diversified with hill and dale, wood and water. To the n. is a broad chalk-band, including the Chiltern range of chalk-hills, which enter from Oxfordshire, and stretch across the county in a n.e. direction into Bedfordshire, partly covered with heath and wood, and near Ivinghoe and Wendover, above 900 ft. high. Sloping n. from these hills, and crossed by narrower bands of greensand and oolite, is the extensive and very fertile vale of Aylesbury, watered by the Thame. The chief rivers are the Thames, bordering the county on the s.w., the Ouse, Ousel, Colne, and Thame, the latter two falling into the Thames. The Grand Junction canal, and the Great Western and North-western railways, intersect the county on the e. and south. The climate of Bucks is mild and healthy; the soil is mostly good, chalk and clay predominating. About half the county is under tillage, the rest in meadows and pasture. The agriculture is not equal to the capabilities of the land, which is often overcropped and exhausted. The farms are generally small, averaging 200 acres. The cottages are generally good. Wheat and beans are the principal crops. The chief dairy product is butter, of which four to five millions of pounds are annually sold, chiefly in London. In the vale of Aylesbury, fattening of cattle is extensively carried on; the sheep are noted for their fine and heavy fleeces; and large numbers of ducks are reared for metropolitan consumption. In the northern portion there are still to be found woods of considerable extent. The beech and oak are the chief timber-trees, but box and juniper are also grown. The chief manufactures are paper, straw-plait, and thread-lace. B. returns 3 members to parliament—losing in 1885 as parliamentary boroughs, its chief towns, Aylesbury, Buckingham, Marlow, and Wycombe. B. contains some Roman and British remains, as traces of Watling, Ickneld, and Akeman streets or ways. The chief ecclesiastical ruins are those of Miss

enden and Notley abbey, the latter of which has been converted into farm-buildings. There are many examples of early English and decorated architecture. The church of Chetwode, near Buckingham (18th c.), contains some very fine examples of ancient glass-staining. Many events of historical interest occurred in this county. It was the scene of contest in the civil wars of Stephen and John. At Chalfont St. Giles, Milton finished his *Paradise Lost*, and at Horton, he wrote *L'Allegro*. At Hampden lived the great patriot of that name; Waller was proprietor of Beaconsfield manor; Atterbury was born at Milton; Stoke Poges churchyard suggested Gray's *Elegy*, and is the place of his burial; at Olney, Cowper lived; at Gregories, near Beaconsfield, Burke died and was buried; Scott, the Biblical commentator, was rector of Aston Sandford; Herschel's great telescope still stands at Slough, where he made most of his important discoveries; and at Stowe is a magnificent mansion—one of the finest in England, alike for extent, architecture, and beauty of site—formerly belonging to the duke of Buckingham. Pop. '71, 175,879; '81, 176,277; '91, 185,284.

**BUCKLAND, CYRUS**, b. Conn., 1799; a successful inventor, pattern-maker of the U. S. armory at Springfield, Mass., and designer of machinery for making arms. He produced many new machines and tools in the line of arms manufacturing. He d. 1891.

**BUCKLAND, FRANCIS TREVELYAN**, son of William Buckland, D.D. (q. v.), b. at Christ Church college, Oxford, Dec. 17, 1826. He was educated at Winchester school, and at Christ Church college, Oxford. He devoted himself to the study of medicine; and after being house-surgeon of St. George's hospital, London, was appointed assistant-surgeon to the 2d life-guards in 1854, retiring in 1868. From his boyhood, he manifested an enthusiastic delight in natural history, especially when it could be applied practically to the cultivation of useful quadrupeds, birds, or fish, in which study he was encouraged and guided by his father. He contributed a vast number of brief papers on various branches of his favorite science to the *Times*, *Field*, *Queen*, *Land and Water* (of which he was editor), etc. He was also the author of *Curiosities of Natural History* (Lond. 1857; second series, 1860; third series, 2 vols., 1866); of a work entitled *Fish-hatching* (Lond. 1863); and *Logbook of a Fisherman and Zoologist* (1876); and editor of a new edition of his father's Bridgewater treatise (Routledge, 1858); and of *White's Selborne* (1876). He was first secretary to the acclimatization society of Great Britain and Ireland. He was an acute observer, and his writings on subjects of natural history in great part exhibit the results of fresh and original observations, which his sprightly style exhibits in a most interesting manner. He had long taken a great interest in fish-culture, and had been actively concerned in the recent endeavors to promote it in England. He had, at his own cost, established under the science and art department, South Kensington, a "museum of economical fish-culture," illustrating the natural history of salmon and sea-fish by means of plaster-casts, which he made with his own hands, and by preparations and dissections in spirits. In 1867, B. was appointed inspector of salmon fisheries for England and Wales, in 1870, special commissioner on the salmon fisheries of Scotland, and in 1877 on the Scotch herring fisheries. He d. 1880. *Life* by Bompas, 1885.

**BUCKLAND, WILLIAM, D.D.**, a distinguished geologist, whose labors tended greatly to the advancement of science, was born at Tiverton, Devonshire, England, in 1784. Educated at Winchester and Oxford, he was appointed, in 1813, reader in mineralogy in Oxford university. The same year, he was elected a fellow of the geological society, and he was twice its president. In 1818, he became reader in geology at Oxford, and was elected fellow of the royal society. In 1822, he received the Copley medal for an account of an assemblage of fossil teeth and bones of 23 different animals, discovered in a cave at Kirkdale, Yorkshire; and, in 1828, he published a treatise founded on it, entitled *Reliquiæ Diluvianæ, or Observations on Organic Remains, attesting the Action of a Universal Deluge*, a theory which he afterwards saw cause to modify. In 1825, B. was appointed a canon of Christ church, Oxford. In 1827, he was chosen a member of the council of the royal society; in 1832, he was elected president of the British association at Oxford, its second meeting; and, in 1836, he published his Bridgewater treatise, *Geology and Mineralogy Considered with Reference to Natural Theology* (2 vols. 8vo). To the transactions of the geological society he contributed many valuable papers; and his sketch of the structure of the Alps, in the *Annals of Philosophy*, is esteemed one of the most interesting of his geological writings. In 1845, he was made dean of Westminster, and, in 1847, a trustee of the British museum. Under his great and continuous labors to benefit others, his mental faculties gave way some years before his death, which took place Aug. 14, 1856.

**BUCKLANDIA**, a magnificent and beautiful evergreen tree of the natural order *hamamelidæ* (see WITCH-HAZEL), a native of the mountains. It grows unbranched to the height of 40 ft., the trunk sometimes 21 ft. in girth at 5 ft. from the ground. The foliage is thick, bright, and glossy. The timber is not valuable. Dr. Hooker thinks that this tree would probably succeed in the mild climate of the w. of England.

**BUCKLE, HENRY THOMAS**, an author who attained a sudden notability in 1857 by the publication of the first volume of a work entitled *The History of Civilization in England*. He was born at Lee, in Kent, Nov. 24, 1831, and was for a very short time at Dr. Holloway's school in Kentish-town, near London. No other school and no

university claims credit for his education, which, nevertheless, was in the highest degree liberal. An easy fortune and a large library enabled Mr. B. to gratify, without any sort of impediment or restraint, an all-absorbing love of letters. After bringing out a second volume of his work in 1861, he undertook a journey to the east, in order to restore his health and extend his knowledge. Having spent the winter in Egypt, he went over the desert to Syria, caught typhus fever by the way, and died at Damascus, May, 1862.

B.'s plan involved, before tracing the particular history of English civilization, a general consideration of the progress of those European countries, England, France, Germany, Scotland, Spain, and America, in which the elements of modern civilization are originally found. The two volumes published are occupied with this preliminary examination, which they do not even complete. His objects, however, are clear. They are (1) to discover what is the essential spirit of a nation's history apart from particular men and events, and (2) to trace out the causes of the progress which has been made in England and France. Under the first head B. endeavors to show that the spirit or character of a people is dependent on material circumstances, such as soil, climate, food, aspect of nature, and the like, and to be sought for in these; under the second head occurs the theory, the vigorous application of which by B. has startled and offended many readers—viz., that the progress of society depends upon skepticism; that the retarding force is credulity; and that the excessive "protection" exercised by governments, the nobility, the church, etc., over the "people," has dwarfed and held back the spirit of freedom and civilization. These and other positions are defended by B. with great ingenuity and lucidity of argument and expression, and have been admitted, even by his opponents, to contain much sound truth. He is accused—perhaps not unjustly—of being often one-sided, and of drawing sweeping deductions from an imperfect survey of the facts. He is said to have been one of the best chess-players in the world. See his *Miscellaneous and Posthumous Works*, last ed. by Grant Allen (1880); *Pilgrim Memories*, by J. S. Stuart Glennie; *Life*, by Huth (1880).

**BUCKLER**, in old armor, was a kind of shield worn on the left arm. The bucklers worn by the *hastati*, or spearmen, among the ancient Romans, were about 4 ft. long, by 2½ in width, made of boards, covered on the inside with linen and sheepskin, and on the outside with iron plate. In the middle ages the B. was round, oval, or square in shape, and was frequently made of wicker-work or of hide, strengthened by metal plates.

**BUCKLES**, metal instruments, consisting of a rim and tongue, used for fastening straps or bands in dress and harness. The use of B., instead of shoe-strings, was introduced into England during the reign of Charles II. They soon became very fashionable, attained an enormous size (the largest being called Artois buckles, after the comte d'Artois, brother of the king of France), and were usually made of silver, set with diamonds and other precious stones. In the latter half of last century the manufacture of B. was carried on most extensively in Birmingham, there being at one time not less than 4000 people employed in that town and its vicinity, who turned out 2,500,000 pairs of B. annually, at the average value of 2s. 6d. per pair. When the trade was at its height, however, fashion changed, and in 1791 we find buckle-makers petitioning the prince of Wales for sympathy, on the ground that the introduction of shoe-strings had nearly ruined their trade. The prince promised to assist them as far as he could, by wearing B. himself, and enjoining his household to do the same; but fashion was too strong even for him, and B. became almost extinct, except as a part of the English court dress.

**BUCKLEY, JAMES MONROE**, D.D., b. 1836, Rahway, N. J.; was educated at Pennington sem., and entered Wesleyan univ., but left college during the freshman year; studied theology in Exeter, N. H. In 1859 he joined the N. H. conf. of the M. E. church. He was stationed at Dover, Manchester, and Concord, 1859-63; Detroit, 1864-5; New York, 1866; Brooklyn, 1867-80. In 1872, 76, 80, Dr. B. was delegate to gen. conf.; in 1881, delegate to ecumenical Meth. conf., London. Since 1890 he has been the editor of the *Christian Advocate*. He edited *Hymn Book of M. E. Church*, 1876; was author of *Christians and the Theatre*, 1876; *Oats or Wild Oats*, 1885; *The Land of the Czar and the Nihilist*, 1886; *Faith Healing*, 1892; *Travels in Three Continents*, 1895, etc. He was active as member of the committee on judicial code for discipline, 1890.

**BUCKMINSTER, JOSEPH**, D.D., 1751-1812; an American Congregational clergyman, b. Mass. He graduated at Yale, studied theology, and was for a time tutor in the college. In 1779 he became pastor of the North church, Portsmouth, N. H., where he remained for a third of a century, retiring only by reason of failing health. He died soon afterwards, while on a visit to Vermont. Dr. B. took deep interest in the controversy that divided the Congregationalists. See *Memoirs* by Eliza B. Lee, 1851.

**BUCKMINSTER, JOSEPH STEVENS**, son of Rev. Joseph, 1784-1812. He was educated at Harvard, and was a teacher in Phillips Exeter academy, having Daniel Webster for one of his pupils. In 1804, he was made pastor of Brattle street church, Boston, one of the leading congregations in New England. In 1806-7, he traveled in Europe, taking a deep interest in the purchase of books for the Boston Athenæum. In 1808, he supervised the republication of *Griesbach's New Testament* (in Greek), and was soon afterwards appointed lecturer on biblical criticism at Cambridge. He was a member of most of the important literary societies of the day. His works have been published in

two volumes. While preparing for his biblical lectures in 1811, he had an attack of epilepsy which caused his death in 1812. See *Memoirs* by Eliza B. Lee, 1851.

**BUCKNER**, SIMON BOLIVAR, military officer, b. in Kentucky, April 1, 1823. He graduated at West Point in 1844; assistant professor there in 1846; served under Taylor and Scott in Mexico in 1846-8, and was wounded at Churubusco; resigned from the army in 1855; superintendent of construction of the Chicago custom-house; served in the Confederate army; surrendered Fort Donelson to Gen. Grant in 1862; subsequently a major-general; and was included in Kirby Smith's surrender in 1865. He was elected governor of Kentucky in 1887; and was the candidate of the National Democrats for vice-president of the United States in 1896.

**BUCKS**, a co. in e. Pennsylvania, on the New Jersey border, bounded by Delaware river; 610 sq.m.; pop. '70, 64,336; '90, 70,615. It possesses mines and quarries of iron, plumbago, zircon, limestone, and sandstone. Surface hilly but well cultivated. The Pennsylvania, and the Philadelphia and Reading railroads pass through. Productions, corn, oats, hay, potatoes, butter, tobacco, etc. Co. seat, Doylestown.

**BUCKS**. See BUCKINGHAMSHIRE.

**BUCKSKIN**, a term applied in England to a strong-twilled woolen fabric for trousers; in America, to deerskin or sheepskin made pliable by dressing it with oil or brains, and used in olden times for breeches, but now almost exclusively for gloves.

**BUCKSPORT**, a town in Hancock co., Me., on the Penobscot river and the Maine Central railroad; 18 m. s. of Bangor. It is a handsome town, regularly laid out on a gentle slope. At Prospect, on the river, is Fort Knox, commanding the narrows and the river both up and down. The principal industries are shipbuilding, fisheries, leather tanning, wood-working, and ice. The town has a United States salmon preserve, the Buck Memorial Library, the East Maine Conference Seminary. It was settled 1762; incorporated, 1792. Pop. '90, 2921.

**BUCKSTONE**, JOHN BALDWIN, a distinguished comedian and dramatic writer, was b. in the suburbs of London, in 1802. Preferring the excitement of the stage to the monotony of an attorney's office, he sought and soon found an opportunity in a provincial town for the display of his theatrical abilities. After a probation in the country, he appeared at the Surrey theater in 1823, and his success was so unequivocal, that he was soon engaged by the "management" of the Adelphi theater, where he continued for many years as leading low comedian. He afterwards played at the Haymarket and Drury Lane theaters, of the former of which he was lessee from 1853 to 1878. He died 31st Oct., 1879. B.'s acting was not more noted for its comicality and humor, which never degenerated into vulgarity, than for its distinct appreciation of the peculiar traits in each individual character he assumed. In all his delineations there was the same broad general effect, but the details of each were wrought out with great care and minuteness. B. was also a prolific dramatic author, and of the 150 pieces he is said to have written for the stage, several have been highly popular. Among the best known are *The Green Bushes*; *The Flowers of the Forest*; *Luke the Laborer*; *The Wreck Ashore*; *The Rough Diamond*; *Good for Nothing*; *the Irish Lion*; and *The Alarming Sacrifice*.

**BUCKTHORN**, *Rhamnus*, a genus of shrubs or small trees of the natural order *rhamnaceæ* (q.v.), distinguished by a bell-shaped 4 to 5-cleft calyx, which divides around the middle after flowering, the upper part falling away, and the base remaining and adhering to the fruit; which is globose, and sometimes succulent, sometimes rather dry or spongy, with 2 to 4 stones. The petals are sometimes wanting. Some of the species are dioecious, some hermaphrodite. They are numerous, and natives of most of the tropical and temperate regions of the world.—The COMMON BUCKTHORN (*R. catharticus*) is a deciduous shrub or low tree, frequent in England and in other parts of Europe and the n. of Asia. The leaves are ovate, crenate, and bright green; the branches spiny; the flowers small, yellowish-green, and densely clustered; male and female flowers on separate plants; the berries about the size of peas, globular, bluish-black, nauseous, and violently purgative. They were formerly much used in medicine, but now more rarely, and only in the form of a syrup prepared from their juice. They supply the *ox. green* (q.v.) or bladder green of painters. The bark affords a beautiful yellow dye. The B. is sometimes planted for hedges, but is of too straggling a habit.—The ALDER BUCKTHORN, or BERRY-BEARING ALDER (*R. frangula*), is also a native of Britain, and is frequent in woods and thickets throughout Europe. It is a shrub, rarely a small tree, with spineless branches, oval entire leaves, and small, whitish, axillary flowers, which are in general somewhat clustered. The charcoal of the wood is light, and is used for the preparation of gunpowder. The bark, leaves, and berries are used for dyeing; the bark for dyeing yellow, and with preparations of iron, black; the unripe berries to dye wool green and yellow; the ripe berries to dye it bluish-gray, blue, and green. There are two native species in the U. S.—DYER'S BUCKTHORN (*R. infectiorius*), is a low shrub, abundant in the s. of Europe, whose unripe fruit yields a brilliant yellow dye. The berries and inner bark of *R. tinctorius*, a native of Hungary, are also used in dyeing; and the berries of *R. saxatilis*, a procumbent shrub, growing amongst rocks as far



n. as Switzerland. The *French berries*, *Avignon berries*, or *yellow berries* of dyers, are the fruit of *R. infectorius*, *R. saxatilis*, *R. amygdalina* (or *oleoides*), and *R. Chusii*.—The SEA BUCKTHORN is a shrub of a different genus and order. See SALLOW-THORN.

**BUCKU**, a name common to several small shrubs of the genus *barosma* (formerly included in *disosma*), natives of the Cape of Good Hope, the leaves of which are used in medicine—sometimes in the form of a powder, more generally of an infusion or a tincture—particularly on account of their powerful operation on the urinary organs, as in chronic inflammation of the bladder, urinary calculus, etc. They are also used in dyspepsia, rheumatism, and dropsy; and are stimulant and antispasmodic, diuretic, diaphoretic, and tonic. They generally appear in commerce mixed with stalks and fruit. They are smooth, leathery, and shining, more or less crenated, or serrated, and are much covered with pellucid dots, which are glands filled with a strongly smelling yellowish volatile oil. The strong odor of *B.* leaves is generally regarded as disagreeable, but the Hottentots perfume themselves with them. They have a warm taste, resembling that of mint.—The genus *barosma* belongs to the natural order *rutaceae*, and is distinguished by regular flowers with 5 petals, 5 fertile and 5 abortive scale-like stamens, anthers bearing a minute terminal gland, and a 5-lobed ovary. The species principally yielding the *B.* leaves of the shops are *B. serratifolia*, *B. crenata*, *B. crenulata*, and *B. venusta*.

**BUCKWHEAT**, *fagopyrum*, a genus of plants of the natural order *polygoneae* (q.v.), or, according to many botanists, a subgenus of *polypogonum*, distinguished by the central embryo, and by racemes of flowers grouped in panicles. COMMON *B.* (*fagopyrum esculentum*, or *polygonyum fagopyrum*) is a native of the basin of the Volga, the shores of the Caspian sea, and many parts of central Asia, from which it is said to have been introduced by the Moors into Spain, and thence to have extended over Europe, in many parts of which, and in some places in Britain, it is now naturalized. Another account represents it as having been brought to Europe by the crusaders. In France, it is called *blé Sarrasin*, or Saracen wheat. It is cultivated on account of the farinaceous albumen of its seeds, which are used, as grain, for food of man and cattle. It is upright, branched, 1 to 8 ft. in height; the leaves are between heart-shaped and arrow-shaped, the flowers pale red, the seed (nut) black and triangular, the angles even (not toothed). The resemblance of this seed in form to the beech-nut is supposed to be the reason of the German name *buchweizen* (beech-wheat), from which the English name is derived. *B.* is a very common crop in some parts of Europe, and of the United States of North America; but is seldom sown in Britain, except as food for pheasants. It requires continued dry weather in autumn for profitable harvesting, and this in the climate of Britain cannot well be reckoned on. In Germany, *B.* is much valued as a crop, particularly for moorlands and other poor soils. In Bretagne, also, it is as extensively cultivated as wheat. It yields very abundantly, and requires little attention and little manure. Forty bushels or more per acre may be expected, weighing 46 or 48 lbs. per bushel; and notwithstanding the resemblance of the seed to grain in its qualities and uses, wheat, or any other cereal crop, generally succeeds well after *B.*, if care has been taken to keep the land clear by tilling. The seed is most frequently used in the shape of groats, or made into pottage, and in the United States thin cakes are very often made of it. It is very nutritious, containing about 10 per cent of gluten and 52 per cent of starch, besides about 6 per cent of gum and sugar. It is said to be as good as barley for fattening cattle, and better for horses than oats. But as the seed is covered with a very hard rind or thin shell, it must always be shelled before being given to cattle. Poultry are very fond of it. Beer is sometimes brewed from it, and it yields a spirituous liquor of good quality; indeed, it is frequently used in gin-distilleries. As green fodder, the herbage of the plant is said to be more nutritious than clover; but it acts as a narcotic on sheep. Bees delight in its flowers, and in some parts of the United States it is sown on this account. In America the seed is usually sown broadcast over the land which has been plowed in autumn or early spring and well scarified or harrowed. About a bushel and a half of seed is required when sown broadcast, but a bushel is sufficient if drilled with a machine. In the latter case it should not be sown in narrower drills than one foot apart, but 2 ft. is recommended as being better for the succeeding crop, as the wider intervals can be properly cultivated. It should not be sown in England before the middle of May, as the least frost is injurious. When the lower seeds are ripe it should be mown, as they are easily shed out if allowed to stand too long. When bread made from *B.* forms the principal food of the people, it is thought to have an injurious action on the brain. As supplementary article, however, it is a favorite among all classes where it is raised.—TARTARIAN *B.* (*F.* or *P. Tataricum*) is distinguished by the toothed edges of the seeds and its more vigorous growth. It is hardy, and adapted for cold situations. It is a native of Siberia. It is very productive, but the seed falls out when ripe more readily than that of the common species; and the flour is darker colored, and somewhat bitter.—NOTCH-SEEDED *B.* (*F.* or *P. emarginatum*) is said to be a native of China. Its seeds are larger than those of common *B.*, and their angles are winged. When grown in Britain, many of its flowers are generally abortive.—PERENNIAL *B.* (*F.* or *P. cymosum*) is a native of Nepal, very vigorous in its growth, but producing, at least in Britain, comparatively little seed.—The triangular black seed of climbing *B.* or blackbine (*F.* or *P. convolvulus*), familiar to every one who has eaten oatmeal cakes or porridge, greatly resembles *B.*, but

is smaller. The plant—a very common weed in gardens and cornfields in Britain—also exhibits much similarity, notwithstanding its different habit and twining stem.—DYER'S B. is *Polygonum tinctorium*. See POLYGONÆÆ.

**BUCKWHEAT TREE**, *Cliftonia ligustrina*, an evergreen shrub in the gulf states, of the order cyrtellaceæ, bearing fragrant white blossoms. It grows around ponds and streams, and gets its name from the shape of its pendulous fruit. Its local name is "titi."

**BUCOLIC**, a term derived from the Greek, meaning "belonging to herdsmen," and equivalent to the Latin term *pastoral*. See PASTORAL POETRY.

**BUCYRUS**, a city and co. seat of Crawford co., Ohio; on the Sandusky river and the Columbus, Sandusky and Hocking, the Ohio Central and the Pennsylvania Co.'s railroads; 62 miles n. of Columbus. It is in an agricultural region, with numerous mineral springs; contains railroad shops and machinery, furniture, and other manufactories; and has a public school library, high school, national banks, electric lights, and daily and weekly newspapers. Pop. '90, 5974.

**BUZACZ**, a t. of the Austrian empire, in Galicia, 30 m. e. n.e. of Stanislawow, on the Stripa, a considerable affluent of the Dniester. A treaty of peace between the Poles and the Turks was signed here in 1672. Pop. '90, 10,096.

**BUD**, *Gemma*, in botany, that part of a plant which contains the rudiments of leaves or flowers prior to their development. Buds are distinguished in—*leaf-buds* and *flower-buds*, the former producing leaves, and having a power of extension into a branch; the latter producing flowers only, and ordinarily destitute of this power of extension. The different parts of the flower being regarded, however, as *leaf-organs* or altered leaves (see FLOWER), the flower-bud may be regarded as merely a modified leaf-bud; and it is well known that, by treatment which checks the luxuriant growth of a plant, it may be caused to produce flower-buds where only leaf-buds could otherwise have been expected to appear—a physiological fact, of which advantage is taken in various ways by gardeners, as by removing portions of the bark and even of the woody part of the stem, root-pruning, confining the roots in a flower-pot, etc. Buds usually appear in the axils of leaves, the terminal bud of a branch being no exception to this rule; and there is no leaf without one or more buds in its axil, although many never pass beyond the most rudimentary state. See BRANCH. In cold and temperate climates, buds are formed about midsummer, beginning to appear as soon as the young branch which bears them has itself been properly developed, and are generally covered with scales and often also coated with resinous matter, by which their tender contents are protected from the severity of winter; but in the trees of warm climates, the protection of scales is generally wanting. Within the leaf-bud, the future leaves may be discovered, often very curiously folded or rolled up, and the different forms and positions which the leaves assume in the bud, are very characteristic of different kinds of plants. This is called the *vernation* (q.v.) of leaves, and is analogous to the *anthesis* (q.v.) of flowers. The buds of exogenous plants originate in cellular prolongations of the medullary rays bursting through the bark; those of endogenous plants are in communication with the cellular matter which lies between the bundles of woody tissue in the stem; and buds elongate into branches by the addition of new cellular matter to the extremity. Leaf-buds are capable of subsisting when separated from the parent plant and placed in favorable situations, developing themselves into new plants with the most exact correspondence in their characteristics to the parent plant; and of this gardeners avail themselves in the process of *budding* (q.v.), and in various ways for the propagation of plants. Some plants propagate themselves by a natural detachment of buds (*bulbils* or *bulblets*), modified into a character analogous to that of *bulbs* (q.v.); and bulbs themselves may indeed be regarded as subterranean leaf-buds with thickened scales. The *eyes* of the potato are also subterranean leaf-buds, the tuber being regarded as a thickened subterranean stem; and all plants with subterranean stems produce subterranean leaf-buds, sending above ground only herbaceous annual shoots, as asparagus, the banana, etc. Buds may be produced in exogenous plants from the extremity of any medullary ray, and may be made to spring from a leafless part of the stem by an incision, the effect of which is to direct a greater supply of sap to the part immediately beneath it. In a few plants, buds are produced on the edges, or even on the surface of leaves. In consequence of their power of independent existence, buds have been looked upon by some physiologists as distinct organized beings congregated in the tree or plant, a view which involves exaggeration, and therefore error.—Flower-buds cannot be used for budding, or otherwise for propagation of the plant, but when removed from their original stock, always die. See POLYPI; REPRODUCTION; and ZOOPHYTES.

**BUDA** (Slavonic, *Bu'din*; German, *Ofen*), a city of Hungary, forming with Pesth (with which it is united by a magnificent suspension-bridge) the capital of the country, is situated on the right bank of the Danube about 180 m. s.e. of Vienna, in lat. 47° 29' n., and long. 19° 3' east. B. has a highly picturesque appearance, being built round the Schlossberg (Castle-hill) in the form of an amphitheater, in the midst of a district covered with vineyards. Crowning this center hill or rock, which has an elevation of 485 ft. above the sea, is the citadel; the palace in which are preserved the royal insignia of

Hungary; and an old Gothic church. Behind, and towering above the rock, rises the Blocksberg, strongly fortified, with a precipitous face to the Danube, the slopes of the other sides being occupied with houses. B. has many educational and charitable institutions; and a fine observatory crowns the Blocksberg. It has some celebrated hot sulphur springs, with a temperature of  $117^{\circ} 5' \text{ F.}$ , from which it derives its German name, Ofen (Oven). It is the seat of the largest university in Hungary, and of many important manufactories, especially flour mills, tobacco factories, sugar refineries, chemical works and machine shops. Near by are produced the famous Ofner wines. Between 1870 and 1890 its growth has been remarkable. It is the commercial and literary centre of Hungary, and the residence, for part of the time, of the Emperor and his court. The Imperial Parliament meets here and at Vienna in alternate years. B. is a place of great antiquity, but its importance dates from 1240, when the fortress was erected on the Schlossberg. During the inroads of the Turks, it was regarded as the key of Christendom. It was captured by Solymán the magnificent in 1526, but retaken in the following year by Ferdinand I., king of Bohemia. In 1541, it was again taken by Solymán, who introduced into it a garrison of 12,000 janizaries; and it remained in possession of the Turks until 1686, when it was captured by the duke of Lorraine. B. and Pesth (q.v.) were in 1873 incorporated with one another, the official name being the compound *Buda-pest*. Pop. '90, 506,884.

**BUDÆUS** (the Latinized form of *Guillaume Budé*), one of the greatest French scholars of his age, was b. in Paris in 1467. He studied there and at Orleans. His works on philology, philosophy, and jurisprudence display extensive learning, but the two best known are the *De Assé et Partibus ejus* (Paris, 1514), which contains a very thorough investigation into ancient coins; and the *Commentarii Lingua Græca* (Paris, 1519), which greatly advanced the study of Greek literature in France, and is still held in high estimation by classical scholars. B.'s knowledge of Greek was particularly good. His style both in Latin and French is nervous, but harsh, and abounds in Greek constructions. His abilities were manifested not only in literature, but in public business. Louis XII. twice sent him to Rome as ambassador; and Francis I. also employed him in several negotiations. At B.'s suggestion, Francis founded the *Collège de France*, and was also persuaded to refrain from prohibiting printing, which the bigoted Sorbonne had advised in 1538. During his life, B. held several important offices. He was royal librarian, maître des requêtes, and provost of Paris. He died 28d Aug., 1540. A collected edition of his works appeared at Basel in 1557. B. was suspected of a leaning towards Calvinism. Certain circumstances render this highly probable. In his correspondence with his friend Erasmus, he repeatedly expresses his contempt for monks and ignorant ecclesiastics, and on one occasion terms the doctors of the Sorbonne "prating sophists." Besides, what is perhaps even more conclusive, shortly after his death, his widow and several members of his family went to Geneva, and openly abjured Catholicism. See his *Life* (1884) and *Lettres inédites* (1887), by E. de Budé.

**BUDAON'**, BUDAUN, or BUDAYOON, a t. of India, 140 m. n.w. of Lucknow, giving its name to a British district of the Rohilcund division of the lieutenant-governorship of the n.w. provinces. It is situated in  $28^{\circ} 2' \text{ n. lat.}$ , and  $79^{\circ} 11' \text{ e. long.}$  Its pop. was officially ascertained in 1891 to amount to 85,400. It was occupied by the mutineers and a body of liberated prisoners from Bareilly, June 1, 1857. The Europeans escaped by flight. It was captured by gen. Whitelock, April 19, 1858, and the rebels in this quarter were soon afterwards entirely subdued.—The district of Budaon contains an area of 2017 sq. m., and a pop. (1891) of 926,000, of which nearly six-sevenths are Hindus, and the remainder mostly Mussulmans. The district is a level, fertile tract on the Ganges and tributaries of it, of which the chief is the Ramgunga.

**BUDDEUS**, JOHANN FRANZ, 1667–1729; a learned Lutheran divine, b. in Pomerania. At Wittenberg he won distinction in languages, theology, and history; was Greek and Latin professor at Coburg, professor of ethical sciences and politics in the university of Halle, and in 1705 professor of divinity at Jena. He produced an historical German dictionary, an ecclesiastical history of the Old Testament, a work on practical philosophy, one on laws, and a universal theological history.

**BUDDHISM—BUDDHA.** The religion known as Buddhism from the title of "The Buddha," meaning "the wise," "the enlightened," acquired by its founder) has existed now for 2460 years, and may be said to be the prevailing religion of the world. In Hindustan, the land of its birth, it has now little hold, except among the Nepalese and some other northern tribes; but it bears full sway in Ceylon, and over the whole eastern peninsula; it divides the adherence of the Chinese with the systems of Confucius and Lao-tse, claiming perhaps two thirds of the population; it prevails also in Japan (although not the established religion); and, n. of the Himalayas, it is the religion of Thibet (where it assumes the form of Lamaism), and of the Mongolian population of central Asia, and extends to the very n. of Siberia, and even into Swedish Lapland. Its adherents are estimated at 400 millions—more than a third of the human race. Yet, till near the middle of this century, nothing was known in Europe respecting the nature and origin of this world-religion, beyond the vaguest notices and conjectures. About the year 1828, Mr. B. H. Hodgson, British resident at the court of Nepal, where Buddhism prevails, discovered the existence of a large set of writings in the Sanscrit language, forming the national canonical books. These books have since been found to be the

texts from which the Buddhist Scriptures of Thibet, Mongolia, and China must have been translated. The books of the Ceylon Buddhists are in the language called Pali; and though not translations of the Nepalese standards, they are found to agree with them in substance, and to be only another and somewhat later version of the same traditions. Translations from the Ceylon standards are used by the Buddhists of Burmah and Siam. Copies of the Sanscrit books of Nepal, having been sent by Mr. Hodgson to the Asiatic societies of London and Paris, engaged the attention of the eminent oriental scholar, Eugène Burnouf, who published in 1844 his *Introduction to the History of Buddhism*; and this book may be said to have been the beginning of anything like correct information on the subject among the western nations.

The most diverse opinions had previously prevailed as to the time and place of the origin of Buddhism. Some looked upon it as a relic of what had been the original religion of Hindustan, before Brahmanism intruded and drove it out; a relic of a widespread primeval worship, whose ramifications it was endeavored to trace by identifying Buddha with the Woden of the Scandinavians, the Thoth or Hermes of the ancient Egyptians, and other mythological personages. Others held that it could not be older than Christianity, and must have originated in a blundering attempt to copy that religion—so striking are the many points of resemblance that present themselves. Although the means are still wanting of giving a circumstantial history of Buddhism, the main outline is no longer doubtful. Oriental scholars now concur in fixing the date of its origin about the beginning of the 6th c. B.C., and in making it spring up in the N. of Hindustan. According to the Buddhist books, the founder of the religion was a prince of the name of Siddhartha, son of Buddhodana, king of Kapilavastu, which is placed somewhere on the confines of Oude and Nepal. He is often called Sakya, which was the name of the family, and also Gautama, the name of the great "Solar" race of which the family was a branch. The name Sakya often becomes Sakya-muni (*muni*, in San., means "solitary," and is allied to Gr. *monos*, the root of "monk"), in allusion to the solitary habits assumed by the prince. To Gautama is frequently prefixed *Brahmana*, meaning *ascetic*. Of the names, or rather titles, given to Siddhartha in his state of perfection, the most important is the *Buddha*,\* which is from the root *budh*, to know, and, according to Wilson, means properly, "he to whom truth is known:" it is indicative of the leading doctrine of his system. Others are "The blessed" (*Bhagavat*); "the venerable of the world;" "the Bodhisatva," the import of which will be afterwards explained. The history of this person is overlaid with a mass of extravagant and incredible legend; and at least one eminent orientalist, Prof. H. H. Wilson, thinks it still doubtful whether the Buddha was an actual historical personage, and not rather an allegorical figment. Agreeing that the doctrine was introduced about the time assigned, he thinks it more likely that it originated with a school formed of persons of various castes, comprising even Brahmans. But by oriental authorities generally, the Buddha is received as the actual personal founder of the religion that goes by his name.

Assuming that the Buddha was a real person, and that there is a basis of fact under the mass of extravagant fable with which he is surrounded, the history of Buddhism may be thus briefly outlined: The prince Siddhartha gives early indications of a contemplative, ascetic disposition; and his father, fearing lest he should desert his high station as Kshatriya (see INDIA AND CASTE) and ruler, and take to a religious life, has him early married to a charming princess, and surrounded with all the splendor and dissipation of a luxurious court. Twelve years spent in this environment only deepen the conviction, that all that life can offer is vanity and vexation of spirit. He is constantly brooding over the thought that old age, withered and joyless, is fast approaching; that loathsome or racking sickness may at any moment seize him; that death will at all events soon cut off all present sources of enjoyment, and usher in a new cycle of unknown trials and sufferings. These images hang like Damocles' sword over every proposed feast of pleasure, and make enjoyment impossible. He therefore resolves to try whether a life of austerity will not lead to peace; and, although his father seeks to detain him by setting guards on every outlet of the palace, he escapes, and begins the life of a religious mendicant, being now about 30 years old. To mark his breaking off all secular ties, he cuts off the long locks that were a sign of his high caste; and as the shortened hair turned upwards, he is always represented in figures with curly hair, which induced early European writers to consider him as of Ethiopian origin. He commences by studying all that the Brahmans can teach him, but finds their doctrine unsatisfactory. Six years of rigorous asceticism are equally vain; and resolving to return to a more genial life, he is deserted by his five disciples, and then undergoes a fierce temptation from the demon of wickedness. But no discouragement or opposition can divert Sakya-muni from the search after deliverance. He will conquer the secret by sheer force of thinking. He sits for weeks plunged in abstraction, revolving the causes

\* There is a confusing variety in the modes in which this name is spelled by European writers. R. Hardy, in his *Manual of Buddhism*, gives more than fifty forms that have come under his notice. Some of the more common are Bud, Bod, But, Buddh, Boodh, Bhodd, Budo, Buddow, Boutta, Poota, Poth, Pot. The Chinese, owing to the meagerness of their articulations, seem to have been unable to come nearer to the real sound than Fo, Foe, or Fohi; from the same cause, they convert Brahma into Fan.

of things. If we were not born, he reflects, we should not be subject to old age, misery, and death; therefore, the cause of these evils is birth. But whence comes birth or continued existence? Through a long concatenation of intermediate causes, he arrives at the conclusion that ignorance is the ultimate cause of existence; and therefore, with the removal of ignorance, existence and all its anxieties and miseries would be cut off at their source. Passing through successive stages of contemplation, he realizes this in his own person, and attains the perfect wisdom of the Buddha. The scene of this final triumph received the name of Bodhimanda (the seat of intelligence), and the tree under which he sat was called Bodhidruma (the tree of intelligence), whence bo-tree. The Buddhists believe the spot to be the center of the earth. Twelve hundred years after the Buddha's death, Hiouen-Tsang, the Chinese pilgrim, found the Bodhidruma—or a tree that passed for it—still standing. Although the religion of Buddha is extinct in the neighborhood, there are, about 5 m. from Gaya Proper, in Bahar, extensive ruins and an old dagoba, or a temple, which are believed to mark the place. Near the temple there flourished, in 1812, a peepul-tree, apparently 100 years old, which may have been planted in the place of the original bo-tree.

Having arrived at the knowledge of the causes of misery, and of the means by which these causes are to be counteracted, the Buddha was now ready to lead others on the road to salvation. It was at Benares that he first preached, or, in the consecrated phrase, "turned the wheel of the law;"\* but the most important of his early converts was Bimbisara, the sovereign of Magadha (Bahar), whose dynasty continued for many centuries to patronize the new faith. During the forty years that he continued to preach his strange gospel, he appears to have traversed a great part of northern India, combating the Brahmans, and everywhere making numerous converts. He died at Kusinagara (in Oude), at the age of 80, in the year 543 B.C.; and his body being burned, the relics were distributed among a number of contending claimants, and monumental tumuli were erected to preserve them. See TOPES.

The most important point in the history of Buddhism, after the death of its founder, is that of the three councils which fixed the canon of the sacred scriptures and the discipline of the church. The Buddha had written nothing himself; but his chief followers, assembled in council immediately after his death, proceeded to reduce his teaching to writing. These canonical writings are divided into three classes, forming the tripitaka or "triple basket." The first class consist of the *sutras*, or discourses of the Buddha; the second contains the *vinaya*, or discipline; and the third the *abhidharma*, or metaphysic. The first is evidently the fundamental text out of which all the subsequent writings have been elaborated. The other two councils probably revised and expanded the writings agreed upon at the first, adding voluminous commentaries; as to the dates of the other two councils, there are irreconcilable discrepancies in the accounts; but at all events the third was not later than 240 B.C., so that the Buddhist canonical scriptures, as they now exist, were fixed two centuries and a half before the Christian era. The Buddhist religion early manifested a zealous missionary spirit; and princes and even princesses became devoted propagandists. A prince of the royal house of Magadha, Mahindo, carried the faith to Ceylon, 307 B.C. The Chinese annals speak of a Buddhist missionary as early as 217 B.C.; and the doctrine made such progress, that in 65 A.D. it was acknowledged by the Chinese emperor as a third state religion. The Chinese Buddhists have always looked on India as their "holy land;" and, beginning with the 4th c. of our era, a stream of Buddhist pilgrims continued to flow from China to India during six centuries. Several of these pilgrims have left accounts of their travels, which throw a light on the course of Buddhism in India, and on the internal state of the country in general, that is looked for in vain in the literature of India itself. See HIOWEN-TSANG. As to the spread of Buddhism n. of the Himalayan mountains, we have the historical fact, that a Chinese general, having about the year 120 B.C. defeated the barbarous tribes to the n. of the desert of Gobi, brought back as a trophy a golden statue of the Buddha.

A prominent name in the history of Buddhism is that of Asoka, king of Magadha, in the 3d c. of our era, whose sway seems to have extended over the whole peninsula of Hindustan, and even over Ceylon. This prince was to Buddhism what Constantine was to Christianity. He was at first a persecutor of the faith, but being converted—by a miracle, according to the legend—he became its zealous propagator. Not, however, as princes usually promote their creed; for it is a distinguishing characteristic of Buddhism, that it has never employed force, hardly even to resist aggression. Asoka showed his zeal by building and endowing viharas or monasteries, and raising topes and other monuments over the relics of Buddha and in spots remarkable as the scenes of his labors. Hiouen-Tsang, in the 7th c. of our era, found topes attributed to Asoka from the foot of the Hindu Kush to the extremity of the peninsula. There exist, also, in different parts of India, edicts inscribed on rocks and pillars inculcating the doctrines of Buddha. The edicts are in the name of king Piyadasi; but orientalists are almost unanimous in hold-

\* From a too literal understanding of this phrase have arisen, probably, those praying-wheels, or rather wheels for meditation, seen standing before Buddhist monasteries in Thibet and elsewhere. The doctrines of Buddha are inscribed on the wheel, which is then set in motion by a windlass, or even by horse-power. The individual monks have portable ones, with which they perform their devotions wherever they may happen to be.

ing Piyadasi and Asoka to be one and the same. Not a single building or sculptured stone has been discovered in continental India of earlier date than the reign of this monarch, whose death is assigned to 236 B.C. A remarkable spirit of charity and toleration runs through these royal sermons. The "king beloved of the gods" desires to see the ascetics of all creeds living in all places, for they all teach the essential rules of conduct. "A man ought to honor his own faith only; but he should never abuse the faith of others. . . . There are even circumstances where the religion of others ought to be honored, and in acting thus, a man fortifies his own faith, and assists the faith of others."

For the glimpses we get of the state of Buddhism in India, we are indebted chiefly to the accounts of Chinese pilgrims. Fa-hian, at the end of the 4th c., found some appearances of decline in the e. of Hindustan, its birthplace, but it was still strong in the Punjab and the north. In Ceylon, it was flourishing in full vigor, the ascetics or monks numbering from 50,000 to 60,000. In the 7th c.—that is, 1200 years after the death of the Buddha—Hiouen-Tsang represents it as widely dominant and flourishing, and patronized by powerful rajahs. Its history was doubtless more or less checkered. The Brahmins, though little less tolerant than the followers of Buddha, seem to have been in some cases roused into active opposition; and some princes employed persecution to put down the new faith.

It was probably during the first four or five centuries of our era, and as a result of persecution, that Buddhists, driven from the great cities, retired among the hills of the west, and there constructed those cave-temples which, for their number, vastness, and elaborate structure, continue to excite the wonder of all who see them. There are reckoned to be not fewer than 900 Buddhist excavations still extant in India, nearly all within the presidency of Bombay. How the destruction of the Buddhist faith in Hindustan came about—whether from internal corruption, or the persecution of powerful princes, adherents of the old faith—we are utterly in the dark. But it is certain that from the time of Hiouen-Tsang's visit, its decay must have been rapid beyond precedent; for about the 11th or 12th c., the last traces of it disappear from the Indian peninsula.

What, then, is the nature of this faith, which has been for so long, and is still, the sole light of so many millions of human beings? In answering this question, we must confine ourselves here to a brief outline of the intellectual theory on which the system is based, and of the general character of its morality and ritual observances, as they were conceived by the founder and his more immediate followers; referring for the various forms which the external observances have assumed to the several countries where it is believed and practiced. See BURMAH, CEYLON, CHINA, JAPAN, LAMAISM.

Buddhism is based on the same views of human existence, and the same philosophy of things in general, that prevailed among the Brahmins. It accepts without questioning, and in its most exaggerated form, the doctrine of the transmigration of souls, which lies at the root of so much that is strange in the eastern character. For a particular account of this important doctrine or notion, which seems ingrained in the constitution of eastern minds, and without a knowledge of which no phase of thought or feeling among them can be understood, the reader is referred to TRANSMIGRATION; while the peculiar cosmogony or system of the universe with which it is associated, and which is substantially the same among Hindus and Buddhists, will be described under INDIA. It is sufficient here to say, that, according to Buddhist belief, when a man dies, he is immediately born again, or appears in a new shape; and that shape may, according to his merit or demerit, be any of the innumerable orders of being composing the Buddhist universe—from a clod to a divinity. If his demerit would not be sufficiently punished by a degraded earthly existence—in the form, for instance, of a woman or a slave, of a persecuted or a disgusting animal, of a plant, or even of a piece of inorganic matter—he will be born in some one of the 186 Buddhist hells, situated in the interior of the earth. These places of punishment have a regular gradation in the intensity of the suffering and in the length of time the sufferers live, the least term of life being 10 millions of years, the longer terms being almost beyond the powers of even Indian notation to express. A meritorious life, on the other hand, secures the next birth either in an exalted and happy position on earth, or as a blessed spirit, or even divinity, in one of the many heavens; in which the least duration of life is about 10 billions of years. But however long the life, whether of misery or of bliss, it has an end, and at its close the individual must be born again, and may again be either happy or miserable—either a god or, it may be, the vilest inanimate object.\* The Buddha himself, before his last birth as Sakyamuni, had gone through every conceivable form of existence on the earth, in the air, and in the water, in hell and in heaven, and had filled every condition in human life. When he attained the perfect knowledge of the Buddha, he was able to recall all these existences; and a great part of the Buddhist legendary literature is taken up in narrating his exploits when he lived as an elephant, as a bird, as a stag, and so forth.

The Buddhist conception of the way in which the quality of actions—which is expressed in Pali by the word *karma*, including both merit and demerit—determines

\* One legend makes Bhagavat, in order to impress upon the monks of a monastery the importance of their duties, point to a besom, and, by his supernatural insight, reveal to them that it had once been a novice, who had been negligent in sweeping the hall of assembly; the walls and pillars, again, he told them, had once existed as monks, who soiled the walls of the hall by spitting upon them.

the future condition of all sentient beings, is peculiar. They do not conceive any god or gods as being pleased or displeased by the actions, and as assigning the actors their future condition by way of punishment or of reward. The very idea of a god, as creating or in any way ruling the world, is utterly absent in the Buddhist system. God is not so much as denied; he is simply not known. Contrary to the opinion once confidently and generally held, that a nation of atheists never existed, it is no longer to be disputed that the numerous Buddhist nations are essentially atheist; for they know no beings with greater supernatural power than any man is supposed capable of attaining to by virtue, austerity, and science; and a remarkable indication of this startling fact is to be seen in the circumstance that some at least of the Buddhist nations—the Chinese, Mongols, and Tibetans—have no word in their languages to express the notion of God. The future condition of the Buddhist, then, is not assigned him by the Ruler of the universe; the “karma” of his actions determines it by a sort of virtue inherent in the nature of things—by the blind and unconscious concatenation of cause and effect. But the laws by which consequences are regulated seem dark, and even capricious. A bad action may lie dormant, as it were, for many existences; the taint, however, is there, and will some time or other break out. A Buddhist is thus never at a loss to account for any calamity that may befall himself or others.

Another basis of Buddhism is the assumption that human existence is on the whole miserable, and a curse rather than a blessing. This notion, or rather feeling, is, like transmigration, common to Buddhism and Brahmanism, and is even more prominent in Buddhism than in the old faith. It is difficult for a European to conceive this state of mind, or to believe that it can be habitual in a whole people; and many signal errors in dealing with the Indian nations have arisen from overlooking the fact. The cause would seem to lie chiefly in the comparatively feeble physical organization of easterns in general. With a vigorous animal vitality, there is a massive enjoyment in mere bodily existence sufficient to drown a large amount of irritation and suffering, leaving life still sweet and desirable; while the spontaneous activity attending this vigor, makes it a pleasure instead of a pain to contend with and conquer difficulties. The Indian, on the contrary, even when he looks robust, has little intensity of animal vitality; and therefore, bodily existence, in itself, has to him little relish. Tedium of life, it is well known, arises more from negative than positive sources; and it requires but little bitter added to make his cup disgusting. So far, again, from finding activity a source of enjoyment, exertion is painful, and entire quiescence is, in his eyes, the highest state of conceivable enjoyment. When to this we add that want of security and peace, and that habitual oppression of the many by the few, with all the attendant degradation and positive suffering, which may be considered the normal state of things in the east, need we wonder that to men so constituted and so circumstanced, life should seem a burden, a thing rather to be feared than otherwise? The little value that Hindus set upon their lives is manifested in many ways. The punishment of death, again, has little or no terror for them, and is even sometimes coveted as an honor. For, in addition to the little value of their present existence, they have the most undoubting assurance that their soul, if dislodged from its present tenement, will forthwith find another, with a chance, at least, of its being a better one.

In the eyes, then, of Sakya-muni and his followers, sentient existence was hopelessly miserable. Misery was not a mere taint in it, the removal of which would make it happy; misery was its very essence. Death was no escape from this inevitable lot; for, according to the doctrine of transmigration, death was only a passage into some other form of existence equally doomed. Even the heaven and the state of godhead which form part of the cycle of changes in this system, were not final; and this thought poisoned what happiness they might be capable of yielding. Brahman philosophers had sought escape from this endless cycle of unsatisfying changes, by making the individual soul be absorbed in the universal spirit (Brahm); Gautama had the same object in view—viz., exemption from being born again; but he had not the same means of reaching it. His philosophy was utterly atheistic, like that of the original Sankhya school of philosophy, whose views he chiefly borrowed, and ignored a supreme God or Creator; it did not leave even an impersonal spirit of the universe into which the human soul could be absorbed. Gautama sees no escape but in what he calls NIRVANA, the exact nature of which has been matter of dispute. According to its etymology, the word means “extinction,” “blowing out,” as of a candle; and most orientalists are agreed that in the Buddhist scriptures generally it is equivalent to annihilation. Even in those schools which attempt to draw a distinction, the distinction is of the most evanescent kind. See NIRVANA.

The key of the whole scheme of Buddhist salvation lies in what Gautama called his four sublime verities. The first asserts that pain exists; the second, that the cause of pain is desire or attachment—the meaning of which will appear further on; the third, that pain can be ended by Nirvana; and the fourth shows the way that leads to Nirvana. This way to Nirvana consists in eight things: right faith, right judgment, right language, right purpose, right practice, right obedience, right memory, and right meditation. In order to understand how this method is to lead to the proposed end, we must turn to the metaphysical part of the system contained in the “concatenation of causes,” which may be looked upon as a development of the second “verity”—namely, that the cause of

pain is desire—or rather, as the analysis upon which that verity is founded. The immediate cause of pain is birth, for if we were not born, we should not be exposed to death or any of the ills of life. Birth, again, is caused by previous existence; it is only a transition from one state of existence into another. All the actions and affections of a being throughout his migrations leave their impressions, stains, attachments adhering to him, and the accumulation of these determines at each stage the peculiar modification of existence he must next assume. But for these adhesions, the soul would be free; not being bound down to migrate into any determinate condition of life, it would follow that it need not migrate at all. These adhesions or attachments, good and bad, depend upon desire, or rather, upon affection of any kind in the soul towards the objects; as if only what moved the soul to desire or avoidance could leave its impress upon it. We thus arrive at desire—including both the desire to possess, and the desire to avoid—as one link in the chain of causes of continued existence and pain. Beyond this the dependence of the links is very difficult to trace; for desire is said to be caused by perception, perception by contact, and so on, until we come to ideas. Ideas, however, are mere illusions, the results of ignorance or error, attributing durability and reality to that which is transitory and imaginary. Cut off this ignorance, bring the mind into a state in which it can see and feel the illusory nature of things, and forthwith the whole train vanishes; illusory ideas, distinction of forms, senses, contact, perception, desire, attachment, existence, birth, misery, old age, death!

*Morality and Religious Observances.*—The eight parts or particulars constituting the theoretical “way” (to Nirvana), was developed by Gautama into a set of practical precepts enjoining the various duties of common life and of religion. They are all ostensibly intended as means of counteracting or destroying the chain of causes that tie men to existence and necessitate being born again, especially that most important link in the chain constituted by the attachments or desires resulting from former actions; although the special fitness of some of the precepts for that end is far from being apparent. It is easy to understand how the austerities that are prescribed might subdue the passions and affections, and lessen the attachment to existence; but how the exercise of benevolence, of meekness, of regard to truth, of respect to parents, etc., on which Gautama laid so much stress, should have this effect, it is difficult to conceive. Luckily for the Buddhist world, Gautama’s moral nature was better than his logic, or rather than the perverse assumptions from which his logic starts; and as he felt strongly—what all men have felt more or less—that these things are essentially right and good, he takes it for granted that they must contribute to what was in his eyes the chief good—escape from existence, or Nirvana. In delivering his precepts, the Buddha considers men as divided into two classes—those who have embraced the religious life (*Sramanas*), and those who continue in the world, or are laymen. These last are considered as too much attached to existence to feel any desire or have any hope of emancipation, at least at this stage. But there are certain precepts which it is necessary for all to obey, that they may not bring greater misery upon themselves in their next births, and rivet the bonds of existence more indissolubly. There are ten moral precepts or “precepts of aversion.” Five of these are of universal obligation—viz., not to kill; not to steal; not to commit adultery; not to lie; not to be drunken. Other five are for those entering on the direct pursuit of Nirvana by embracing the religious life: to abstain from food out of season—that is, after midday; to abstain from dances, theatrical representations, songs, and music; to abstain from personal ornaments and perfumes; to abstain from a lofty and luxurious couch; to abstain from taking gold and silver. For the regular ascetics or monks, there are a number of special observances of a very severe kind. They are to dress only in rags, sewed together with their own hands, and to have a yellow cloak thrown over the rags. They are to eat only the simplest food, and to possess nothing except what they get by collecting alms from door to door in their wooden bowl. They are allowed only one meal, and that must be eaten before midday. For a part of the year, they are to live in forests, with no other shelter except the shadow of a tree, and there they must sit on their carpet even during sleep, to lie down being forbidden. They are allowed to enter the nearest village or town to beg food, but they must return to their forests before night.

Besides the absolutely necessary “aversions and observances” above mentioned, the transgression of which must lead to misery in the next existence, there are certain virtues or “perfections” of a supererogatory or transcendent kind, that tend directly to “conduct to the other shore” (Nirvana). The most essential of these are almsgiving or charity, purity, patience, courage, contemplation, and knowledge. Charity or benevolence may be said to be the characteristic virtue of Buddhism—a charity boundless in its self-abnegation, and extending to every sentient being. The benevolent actions done by the Buddha himself, in the course of his many millions of migrations, were favorite themes of his followers. On one occasion, seeing a tigress starved and unable to feed her cubs, he hesitated not to make his body an oblation to charity, and allowed them to devour him. Benevolence to animals, with that tendency to exaggerate a right principle so characteristic of the east, is carried among the Buddhist monks to the length of avoiding the destruction of fleas and the most noxious vermin, which they remove from their persons with all tenderness.

There are other virtues of a secondary kind, though still highly commendable. Thus,



not content with forbidding lying, the Buddha strictly enjoins the avoidance of all offensive and gross language, and of saying or repeating anything that can set others at enmity among themselves; it is a duty, on the contrary, especially for a *sramana*, to act on all occasions as a peacemaker. Patience under injury, and resignation in misfortune, are strongly inculcated. Humility, again, holds a no less prominent place amongst Buddhist graces than it does among the Christian. The Buddhist saints are to conceal their good works, and display their faults. As the outward expression of this sentiment of humility, Gautama instituted the practice of confession. Twice a month, at the new and at the full moon, the monks confessed their faults aloud before the assembly. This humiliation and repentance seems the only means of expiating sin that was known to Gautama. Confession was exacted of all believers, only not so frequently as of the monks. The edicts of Piyadasi recommend a general and public confession at least once in five years. The practice of public confession would seem to have died out by the time of Hiouen-Thsang's visit to India.

Such are the leading features of the moral code of the Buddha, of which it has been said, that "for pureness, excellence, and wisdom, it is only second to that of the Divine Lawgiver himself." But the original morality of Buddhism has, in the course of time, been disfigured by many subtleties, puerilities, and extravagances, derived from the casuistry of the various schools of later times; just as the casuistry of the Jesuits, for instance, perverted many of the precepts of Christianity. The theory on which the Buddha founds his whole system gives, it must be confessed, only too much scope to such perversions; for, on that theory, truth is to be spoken, self to be sacrificed, benevolence to be exercised, not for the sake of the good thus done to others, but solely for the effect of this conduct on the soul of the actor, in preparing him for escape from existence. To teach men "the means of arriving at the other shore," was another expression for teaching virtue; and that other shore was annihilation. On this principle, the Buddhist casuist can, like the Jewish, render of none effect the universal law of charity and the duty of respecting and aiding parents, on which the Buddha laid such stress. Thus, a *Bikshu*—that is, one who has engaged to lead a life of self-denial, celibacy, and mendicancy, and is thus on the high-road to Nirvana—is forbidden to look at or converse with a female, lest any disturbing emotion should ruffle the serene indifference of his soul; and so important is this, that "if his mother have fallen into a river, and be drowning, he shall not give her his hand to help her out; if there be a pole at hand, he may reach that to her; but if not, she must drown."—*Wilson*.

Contemplation and science or knowledge (i. e., of the concatenation of causes and effects) are ranked as virtues in Buddhism, and hold a prominent place among the means of attaining Nirvana. It is reserved, in fact, for abstract contemplation to effect the final steps of the deliverance. Thought is the highest faculty of man, and, in the mind of an eastern philosopher, the mightiest of all forces. A king who had become a convert to Buddhism is represented as seating himself with his legs crossed, and his mind collected; and "cleaving, with the thunderbolt of science, the mountain of ignorance," he saw before him the desired state. It is in this cross-legged, contemplative position that the Buddha is almost always represented—that crowning intellectual act of his, when, seated under the Bo-tree (q. v.), he attained the full knowledge of the Buddha, saw the illusory nature of all things, broke the last bonds that tied him to existence, and stood delivered for evermore from the necessity of being born again, being considered the culmination of his character, and the highest object of imitation to all his followers.

"Complete" Nirvana or extinction cannot, of course, take place till death; but this state of preparation for it, called simply Nirvana, seems attainable during life, and was, in fact, attained by Gautama himself. The process by which the state is attained is called *Dhyana*, and is neither more nor less than ecstasy or trance, which plays so important a part among mystics of all religions. The individual is described as losing one feeling after another, until perfect apathy is attained, and he reaches a region "where there are neither ideas, nor the idea of the absence of ideas!"

The *ritual* or *worship* of Buddhism—if worship it can be called—is very simple in its character. There are no priests, or clergy, properly so called. The *Sramanas* or *Bikshus* (mendicants) are simply a religious order—a kind of monks, who, in order to the more speedy attainment of Nirvana, have entered on a course of greater sanctity and austerity than ordinary men; they have no sacraments to administer or rites to perform for the people, for every Buddhist is his own priest. The only thing like a clerical function they discharge, is to read the scriptures or discourses of the Buddha in stated assemblies of the people held for that purpose. They have also everywhere, except in China, a monopoly of education; and thus in Buddhist countries education, whatever may be its quality, is very generally diffused. In some countries, the monks are exceedingly numerous, around Lhasa in Thibet, for instance, they are said to be one third of the population. They live in *viharas* or monasteries, and subsist partly by endowments, but mostly by charity. Except in Thibet, they are not allowed to engage in any secular occupation. The vow is not irrevocable. This incubus of monachism constitutes the great weakness of Buddhism in its social aspect. Further particulars regarding Buddhist monks and monasteries, as well as the forms of Buddhist worship generally, will be given when speaking of the countries where the religion prevails. See LAMAISM.

The adoration of the statues of the Buddha and of his relics is the chief external ceremony of the religion. This, with prayer and the repetition of sacred formulas, constitutes the ritual. The centers of the worship are the temples containing statues, and the topes or tumuli erected over the relics of the Buddha, or of his distinguished apostles, or on spots consecrated as the scenes of the Buddha's acts. The central object in a Buddhist temple, corresponding to the altar in a Roman Catholic church, is an image of the Buddha, or a dagoba or shrine containing his relics. Here flowers,\* fruit, and incense are daily offered, and processions are made with singing of hymns. Of the relics of the Buddha, the most famous are the *teeth* that are preserved with intense veneration in various places. Hiouen-Tsang saw more than a dozen of them in different parts of India; and the great monarch Ciladitya was on the eve of making war on the king of Cashmere for the possession of one, which, although by no means the largest, was yet an inch and a half long. The tooth of the Buddha preserved in Ceylon, a piece of ivory about the size of the little-finger, is exhibited very rarely, and then only with permission of the English government—so great is the concourse and so intense the excitement. See CEYLON.

There appears at first sight to be an inconsistency between this seeming worship of the Buddha and the theory by which he is considered as no longer existing. Yet the two things are really not irreconcilable; not more so, at least, than theory and practice often are. With all their admiration of the Buddha, his followers have never made a god of him. Gautama is only the last Buddha—the Buddha of the present cycle. He had predecessors in the cycles that are past (24 Buddhas of the past are enumerated, and Gautama could even tell their names); and when, at the end of the present cycle, all things shall be reduced to their elements, and the knowledge of the way of salvation shall perish with all things else, then, in the new world that shall spring up, another Buddha will appear, again to reveal to the reascent beings the way to Nirvana. Gautama foretold that Mitraya, one of his earliest adherents, should be the next Buddha† (the Buddha of the future), and he gratified several of his followers with a like prospect in after-cycles. The Buddha was thus no greater than any mortal may aspire to become. The prodigious and supernatural powers which the legends represent him as possessing, are quite in accordance with Indian ideas; for even the Brahmins believe that by virtue, austerities, and science a man may acquire power to make the gods tremble on their thrones.

The Buddha, then, is not a god; he is the ideal of what any man may become; and the great object of Buddhist worship is to keep this ideal vividly in the minds of the believers. In the presence of the statue, the tooth, or the footprint, the devout believer vividly recalls the example of him who trod the path that leads to deliverance. This veneration of the memory of Buddha is perhaps hardly distinguishable, among the ignorant, from worship of him as a present god; but in theory, the ritual is strictly commemorative, and does not necessarily involve idolatry, any more than the garlands laid on the tomb of a parent by a pious child. See TOPE.

The prayers addressed to the Buddha are more difficult to reconcile with the belief in his having ceased to exist. It is improbable, indeed, that the original scheme of Buddhism contemplated either the adoration of the statues of the Buddha, or the offering of prayers to him after his death. These are an after-growth—accretions upon the simple scheme of Gautama, and in a manner forced upon it during its struggle with other religions. For, a system of belief that seeks to supplant other systems, finds itself enticed to present something to rival and outdo them, if possible, in every point. Even the Christian church, in the middle ages, adopted with this view many of the rites and legends of paganism that were quite inconsistent with its own character; merely casting over them a slight disguise, and giving them Christian names. Prayer, too, is natural to man—an irrepressible instinct, as it were, and had to be gratified. And then the inconsistency in uttering prayers when there is no one to hear or answer, glaring as it appears to us, is by no means great to the eastern mind. Prayers, like other formulas, are conceived less as influencing the will of any superior being to grant the request, than as working in some magical way—producing their effects by a blind force inherent in themselves. They are, in short, mere incantations or charms. Even the prayers of a Brahman, who believes in the existence of gods, do not act so much by inclining the deity addressed to favor the petitioner, as by compelling him through their mysterious potency—through the operation of a law above the will of the highest gods. The Buddhist, then, may well believe that a formula of prayer in the name of "the venerable of the world" will be potent for his good in this way, without troubling himself to think whether any conscious being hears it or not.

The element in Buddhism which more than any other, perhaps, gave it an advantage over all surrounding religions, and led to its surprising extension, was the spirit of universal charity and sympathy that it breathed, as contrasted with the exclusiveness of

\*The quantity of flowers used as offerings is prodigious. A royal devotee in Ceylon, in the 15th c., offered on one occasion 6,480,320 flowers at the shrine of the tooth. At one temple it was provided that there should be offered "every day 100,000 flowers, and each day a different flower."

†One who is on the way to become a supreme Buddha, and has arrived at that stage when he has only one more birth to undergo, is styled a *Bodhisatva* (having the essence of knowledge); a mere candidate for Nirvana is an *arhat* (ven. rahit).

caste. In this respect, it held much the same relation to Brahmanism that Christianity did to Judaism. It was, in fact, a reaction against the exclusiveness and formalism of Brahmanism—an attempt to render it more catholic, and to throw off its intolerable burden of ceremonies. Buddhism did not expressly abolish caste, but only declared that all followers of the Buddha who embraced the religious life were thereby released from its restrictions; in the bosom of a community who had all equally renounced the world, high and low, the twice-born Brahman and the outcast were brethren. This was the very way that Christianity dealt with the slavery of the ancient world. This opening of its ranks to all classes and to both sexes—for women were admitted to equal hopes and privileges with men, and one of Gautama's early female disciples is to be the supreme Buddha of a future cycle—no doubt gave Buddhism one great advantage over Brahmanism. The Buddha, says M. Müller, "addressed himself to castes and outcasts. He promised salvation to all; and he commanded his disciples to preach his doctrine in all places and to all men. A sense of duty, extending from the narrow limits of the house, the village, and the country, to the widest circle of mankind, a feeling of sympathy and brotherhood towards all men, the idea, in fact, of humanity, were first pronounced by Buddha." This led to that remarkable missionary movement, already adverted to, which, beginning 300 B.C., sent forth a succession of devoted men, who spent their lives in spreading the faith of Buddha over all parts of Asia.

For the history of Buddha and his religion see Burnouf, *Introduction à l'Histoire du Bouddhisme Indien* (1876); Köppen, *Die Religion des Buddha* (1857); Oldenburg, *Buddha* (1881; Eng. trans.; 1882); Wurm, *Der Buddha* (1880); St. Hilaire, *Le Bouddha* (1862); Wassiljew, *Der Buddhismus* (1860); Kern, *Geschiedenis van het Bouddhisme* (1884); Rhys-Davids, *Buddhism* (1880), and *Hibbert Lectures* (1881); Mills, *The Indian Saint* (1876); Arnold, *The Light of Asia* (1882); Feer, *Études Bouddhiques* (1873); Titcomb, *Buddhism* (1886); Bastian, *Der Buddha in seiner psychologie* (1882); Alvis, *Buddhist-Nirvana* (1871); Sénart, *La Légende du Bouddha* (1875); Bigandet, *Legend of Gaudama* (1886); Obry, *Du Nirvana Bouddhique* (1863); Max Müller, *Buddhist Nihilism* (1869); Lillie, *Buddha* (1881); Seydel, *Das Evangelium und die Buddhaesage* (1882); Eitel, *Buddhism* (1878); Kistner, *Buddha* (1869), with a complete bibliography; Sir Monier Williams, *Buddhism* (1888); the works of Beal, Edkins, Eitel, Legge, and Schott for Chinese Buddhism; of Köppen and Schlagintweit for Tibetan; and of Alabaster for Siamese.

The following are some of the principal translations of, or compilations from, original works in Pali, Sanskrit, Tibetan, and Chinese: Spence Hardy, *Manual of Buddhism* (1860); *Eastern Monachism* (1860), and *Legends and Theories of the Buddhists* (1866); Burnouf, *Le Lotus de la Bonne Loi* (1852); Schiefner, *Taranatha's Geschichte des Buddhismus* (1869) and *Lebensbeschreibung Sakjamunis* (1849); Rhys-Davids, *Buddhist Birth Stories*, vol. 1 (1880); Rogers, *Buddhaghosha's Parables* (1870); Foucaux, *Histoire du Bouddha* (1868); *Lalita Vistara*, by Raj. Mitra and Lefmann; *Dhammapada*, by Fausbøll, Müller, Beal, Rockhill, Weber, and Schulze; parts of the canon in *Sacred Books of the East*, vols. x., xi., xiii., xvii., xix., and xxi.

**BUDDING**, sometimes called **INOCULATION**, is an operation analogous to Grafting (q.v.), or indeed may be regarded as merely a particular mode of grafting, in which a leaf-bud is used as a graft instead of a young shoot. It is generally preferred for trees which are apt to throw out much gum when wounded, as the plum, cherry, peach, apricot, and stone-fruits in general, also for roses and many other flowering shrubs. The time for it is when the bud is perfectly formed, about or a little after midsummer. The bud to be employed is taken, by means of a sharp knife, from the branch on which it has grown—generally a branch of the former year—a small portion of the bark and young wood being taken with it, extending to about half an inch above and three quarters of an inch below the bud. The woody part is then separated from the bark and bud; but care is to be taken that the bud itself is not injured, which, however, is always the case when the operation is attempted before the bud is sufficiently matured, and is indicated by a hollow left at the bud when the wood has been removed. A longitudinal and a transverse cut are made in the bark of the stock intended to receive the bud, in the form of the letter T; the bark is raised on both sides, for which purpose the handle of the *budding-knife* generally terminates in a thin ivory blade, and the bud is inserted, the bark attached to the bud being cut across so as to join exactly to the transverse cut in that of the stock, that the bud may be nourished by the descending sap. The leaf in the axil of which the bud grew is cut off. The newly-inserted bud is for a time preserved in its place, and prevented from too much access of air by strands of bass-matting. The process just described is distinctively called *shield-budding*, and is the most common method of budding. Other methods are occasionally employed, as *reversed shield-budding*, in which the incisions are in the form of the letter T reversed, which is sometimes practiced with trees of the orange family and others in which there is a very great flow of descending sap; and *scallop-budding*, in which a thin slip of bark is removed from the stock, and a similar slip bearing the bud is placed upon it, the upper edge and one of the lateral edges being made to fit exactly. Scallop-budding may be performed in spring, and if it fails, the ordinary method may be resorted to in summer. B. is also sometimes performed by taking a tube of bark with one or more buds from a small branch, and placing it upon a branch of similar thickness in the stock, from which the bark has been removed.

**BUDDLE'A**, a genus of shrubs of the natural order *scrophularineæ*, of which many species are known, all natives of the warmer parts of the world, and some of them much admired for their beautiful flowers. *B. Neemda* has received the praise of being one of the most beautiful plants of India. *B. globosa*, a native of Chili, with downy branches, lanceolate leaves, and globose heads of orange-colored flowers, is hardy enough to endure the climate of most parts of England, and has become a very common ornament of gardens, but in Scotland it needs the protection of the greenhouse or frame.

**BUDE BURNER** and **BUDE LIGHT**. The burner, so called from the name of the residence of the inventor, Mr. Gurney, consists of two, three, or more concentric argand burners, each inner one rising a little above the outer. On the same principle, a powerful light is produced by a number of flat flames disposed in concentric circles like the petals of a rose.—The Bude light, also the invention of Mr. Gurney, depends upon introducing oxygen into the center of the flame instead of air, as in the common argand. A light of the most dazzling brilliancy is thus produced. The house of commons is lighted by this means, the brilliancy being softened by the intervention of a ceiling of ground-glass.

**BUDGELL**, EUSTACE, 1686–1787, a writer for the *Teller*, *Spectator*, and *Guardian*. He was under-secretary to Addison, and afterwards a member of the Irish parliament. Still later he was controller-general of the revenue in Ireland, from which office he was removed because of a lampoon written by him upon the lord lieutenant. In 1720, he lost £20,000 in the South Sea scheme, and afterwards spent £5000 to get into parliament, but did not succeed. Then he started the *Bee*, a short-lived weekly journal. Lawsuits accumulated, and he ended his troubles by drowning, leaving on his table a slip of paper on which was written "What Cato did, and Addison approved, cannot be wrong."

**BUDGET**, from the same source as the French *bougette*, means a small bag, and has been used metaphorically to express a compact collection of things, as a budget of news, a budget of inventions, and the like. Water-budgets or buckets were a very honorable blazon on a coat-armorial, as being generally conferred in honor of some valiant feat for supplying an army with water. Guillim, in his *Display of Heraldry*, thinks the three mighty men in David's army who broke into the host of the Philistines, and drew water from the well of Bethlehem, "deserved to have been remunerated with such armorial marks on their coat-armors for their valor."

The term, "The Budget," is in Britain, from long usage, applied to that miscellaneous collection of matters which aggregate into the annual financial statement made to parliament by the chancellor of the exchequer. It contains two leading elements—a statement how the nation's account of charge and discharge stands in relation to the past, and an explanation of the probable expenditure of the ensuing year, with a scheme of the method in which it is to be met, whether by the existing or new taxes, or by loan. The statement of the budget is always an important, sometimes a very exciting occasion; as for instance, sir Robert Peel's adoption of an income-tax in 1842, and his legislation for free-trade in 1846. Another instance is Mr. Goschen's budget proposals in connection with licensing in 1890.

**BUDHANUH**, a t. of India, in the British district of Mozuffurnuggur, n.w. provinces, on the route from Kurnoul to Meerut, 43 m. s. from Kurnoul. The surrounding country is wooded and well cultivated, and the bazaar of the town is well supplied. Pop. 5900.

**BUDINGTON**, WILLIAM IVES, D.D., b. Conn., 1815; graduated at Yale, and in theology at Andover. He was ordained in 1840, and took charge of the First Congregational Church in Charlestown, Mass., remaining there 14 years. He published a history of that church in 1845. In 1855, he took charge of the Clinton Avenue Church, Brooklyn, New York. Falling health compelled him to relinquish public duties early in 1879, and he died in November. Dr. B. was one of the acknowledged leaders in his denomination.

**BÜDOS HEGY**, a mountain belonging to the Carpathians, on the eastern border of Transylvania, in lat. 46° 12' n., and long. 25° 40' east. It is quite isolated, steep, and of conical shape, densely wooded on the lower slopes, and has an elevation of 7840 feet. It has numerous caverns, that emit sulphurous exhalations, and from its base issue strong sulphur springs.

**BUDWEIS**, a t. of Bohemia, situated on the Moldau, about 77 m. s. of Prague. B. is well built, is partially fortified, and has an old cathedral, manufactures of woollens, stone-ware, machines, lead-pencils, saltpeter, etc. It has also a brisk trade in grain, wood, coals, and salt. There are numerous schools, both for education in the Bohemian and in the German tongue. The Slavic name of B. is *Budejovice*. Pop. '90, 28,491. In the neighborhood are an old feudal fortress, the Schloss Frauenberg, one of the seats of prince Schwarzenberg, and a fine new Gothic castle also belonging to the same family.

**BUEL**, JESSE, 1778 1839; agriculturist, b. in Conn., began life as a printer, and established the *Albany Argus* in 1813, continuing as the publisher until 1821, when he retired to a farm and became one of the most successful cultivators in the country. In 1834, he started the *Albany Cultivator*, and subsequently published the *Farmer's Instructor* and the *Farmer's Companion*.

**BUELL, DON CARLOS**, b. Ohio, 1818; a graduate of West Point; served in the Florida and Mexican wars, from 1849 to 1861, assistant adjutant-general in various military departments; in the latter year commanding the department of the Ohio, and in 1862 made maj-gen. of volunteers. He resigned from the army in 1864, and was subsequently president of an iron works corporation, and pension agent at Louisville, Ky.

**BUENA VISTA**, a co. in n.w. Iowa, traversed by the Illinois Central railroad, and watered by Coon and other rivers; 576 sq. m.; pop. '90, 13,547. Agriculture is the main business. Co. seat, Storm Lake.

**BUENA VISTA**, a small settlement in Coahuila, Mexico, on the San Juan, a tributary of the Rio Grande, 7 m. s. of Saltillo; the site of a battle between the United States forces under Gen. Taylor and the Mexicans under Santa Anna, Feb. 23, 1847, the former with 5200 men and the latter with about 20,000. After two days of sharp fighting, Santa Anna was defeated with a loss of nearly 2000; Taylor's loss being 746. The result was due in great part to the superior effectiveness of Taylor's artillery.

**BUEN AYRÉ**, in Spanish, or **BON AIR** in French, an island in that subdivision of the West Indies which runs parallel with the coast of Venezuela. It is in lat. 12° 20' n., and long. 68° 27' w., being 80 m. to the e. of Curaçao, which, like itself, belongs to the Dutch. B. A. produces cattle and salt. It measures 20 m. by 4, and contains about 4000 inhabitants. It has a tolerable harbor on its leeward or s.w. side.

**BUEÑOS AYRES** (*Buenos Aires*), the largest and most important province of the Argentine Republic in South America, extends itself along the Atlantic, from the mouth of the Plata to that of the Rio Negro on the 41st parallel; on the n.e. it is washed by the Plata and the Paraná, the latter separating it from Entre Rios. Its area is estimated at 63,000 sq. m., with a population of (1895) 921,225. Besides the existing province of the name, it at one time comprised Uruguay or Banda Oriental, Paraguay, Bolivia, and the Argentine Confederation, being originally an appendage of Peru, under the immediate command of a capt. gen., and becoming, in 1775, a separate vice-royalty of itself. Though the first three of these four divisions broke off chiefly in connection with the revolutionary struggle, yet the fourth continued, down to 1853, to recognize the city of B. A. as its head; and the inland states endeavored both by war and diplomacy to re-annex the maritime province to the republic, till, in June, 1860, their object was obtained, and the city remained capital of the province and temporary capital of the confederation until it was federalized in 1880; the seat of the provincial government being removed to La Plata, 30 m. to the s.e. in 1884. Like each of the other provinces, Buenos Ayres has its own budget and its own judicial system. In 1895 its revenue was \$13,125,667, and its expenditure \$12,881,551. Its governor is elected by the people in the province, and is independent of the central executive in his constitutional functions. Besides two members of the national senate, who are chosen by the provincial legislature, Buenos Ayres being the most populous of the provinces sends a larger number of representatives to the national chamber of deputies than any other state. The coast line, 740 m., with about 150 m. on the Paraná, is low and sandy, and the ports are few. The harbor of the city of B. A. is very bad and Bahia Blanca, in the extreme s., is little frequented; but the newly founded La Plata possesses a harbor at once commodious and accessible. In 1887 a bill was passed for establishing "agricultural colonies" at all railway stations within 60 m. of the capital, where towns did not already exist.

The country approaches so nearly to a plain, that most of the rain which falls is either absorbed or evaporated, or lost in salt-lakes, comparatively little drainage entering the Paraná or the Plata. The climate, though on the whole healthy and agreeable, is yet by no means steady or uniform. Every wind, in general, has, to a remarkable degree, its own weather—sultriness coming from the n., freshness from the s., moisture from the e., and storm from the w.; and besides the periodical heats of every summer, successive years of more than ordinary drought occur. Agriculture, properly so called, is followed chiefly in the more temperate and humid districts of the eastern coast; while the interior presents an almost uninterrupted pasturage to countless herds of horses and cattle. Under these circumstances, the business of grazing and hunting combined occupies or interests the great bulk of the population—a business that renders the province, whether as to the disposal of its productions or as to the supply of its wants, peculiarly dependent on that external commerce, which, throughout the whole of Spanish America, has naturally been identified with political freedom. Let it be added that the Indians are intractable, and that the Africans, few in number at best, are principally menials; and it is seen at once why, in spite of national jealousies and sectarian prejudices, immigration from Europe has been not only tolerated by public opinion, but also encouraged by legislative enactments.

**BUEÑOS AYRES**, a city of South America, on the right bank of the Plata, which here, at a distance of 150 m. from the open sea, is 36 m. across. It stands in lat. 34° 36' s., and long. 58° 24' w. Its disadvantages as a maritime town are great; the flood-tides of the ocean, when backed by easterly winds, being apt to make the estuary overflow its banks; and again, when westerly winds prevail, the estuary loses both width and depth. Monte Video, on the opposite shore, possesses a better harbor, and is nearer to

the Atlantic, nor can it be doubted that, but for the greater facilities of B. A. in carrying on an inland trade, the former town would have proved a dangerous rival. Steam is rapidly placing both upon more equal terms. Of the trade, however, with Chile by Mendoza and the Andes—a trade which must always be carried on by land—B. A. must still command the monopoly. In 1887 a system of harbor works (docks, basins, etc.) was commenced, to cost \$20,000,000, and to connect the two channels of the Plata bringing the largest vessels up to the wharf. A thorough scheme of water supply and drainage has been undertaken in recent years. B. A. labors under some peculiar disadvantages, its immediate territory, purely alluvial, being almost destitute of timber and stone, and fuel is almost as scarce as building material. The city including suburbs, contained (1896) 690,788 inhabitants against 459,663 in 1887. In June 1896 a census of the city showed that about 345,500 of the inhabitants were foreigners. Newspapers are published in the French, English, Italian, German, and Spanish languages. The city is regularly laid out. The streets cross each other at right angles, and are for the most part paved with granite. A thorough drainage system is being carried out, and there are many miles of street railways. But the narrowness of the streets prevents the laying of a double track, and the cars travel by one street and return on a parallel street. A system of boulevards is being carried out and new thoroughfares cross the old streets in a diagonal direction. Most of the houses are one story high, but newer buildings are often of considerable dimensions. The government building is large and imposing. It is situated on one side of the principal square, the Plaza de la Victoria. The University occupies a fine building and has an extensive library. The river Plata, which is here 36 miles broad, is navigated with difficulty, and the largest vessels are obliged to anchor several miles off in the roadstead, whence their cargoes are discharged by means of lighters. For several years a system of harbor works (docks, basins, etc.) has been in process of construction. It is estimated that about one-half of the tonnage entered and cleared at Argentine ports belongs to this port. Notwithstanding the efforts to improve the sanitary condition of the city, the mortality among children is still very great.

In 1882 Buenos Ayres, which up to that time had been the capital of the province of the same name, was placed, together with the surrounding district of 83 sq. mi., under the Federal Government. A continental exhibition was held here in 1882. B. A. was founded in 1535; but having subsequently been twice destroyed by the Indians, it ought, in reality, to date only from 1580. In the beginning of the nineteenth century, it achieved, with very little aid from home, two triumphs over England. In 1806, one British force, which had just captured the city, was obliged to surrender; and in 1807, another which attempted to recover the place, was repulsed with heavy loss; and these successes over so formidable a foe emboldened the colonists, three years afterwards, to throw off the yoke of Spain.

**BUFFALO, *Bos bubalus***, an animal of the ox tribe, very important and useful to man. It is a native of the East Indies, where it has been long domesticated, and from which it was carried to Egypt and to the south of Europe. It was introduced into Italy about the close of the 6th c., A.D. The name B. is popularly though incorrectly given to the American bison which will be found fully treated in the article **BISON**.

The B. is larger than the ox, and its limbs are stouter. Its form is more angular and clumsy; the head is larger in proportion to the size of the body; and the forehead is rather convex, and higher than broad; the dorsal line rises into a considerable elevation above the shoulders; the dewlap and the tail resemble those of the ox; the horns are large, slightly compressed, recline towards the neck, and have their points turned up. It is characteristic of the B., when walking or running, to carry the head with the muzzle projecting straight forward, and the horns laid back on the shoulders. The hair is irregular and bristly, often very thin, so that the smooth brown hide "shines with an unpleasant polish in the sunlight." In this as in other respects, the animal is adapted for marshy situations, which it naturally affects; preferring for its food the rank coarse herbage which they afford, delighting to immerse itself in water till only its head appears above the surface, in which condition it will remain for hours, and often enveloping itself in mud as a protection against insects. On account of these propensities, the buffaloes used as beasts of burden in India are seldom laden with any goods liable to be spoiled by water, as the animal is always ready to take an opportunity of lying down with his load in any river or pond which presents itself. In Italy, the B. seems nowhere more at home than in the Pontine marshes and the pestilential Maremma.

The B. is a very powerful animal, much more powerful than the ox, and capable of dragging or carrying a far heavier load. The female yields a much greater quantity of milk than a cow, and of excellent quality. It is from B. milk that the *ghes* or semi-fluid butter of India is made. The hide is greatly valued for its strength and durability, but the flesh is very inferior to that of the ox.

The B. exhibits a considerable amount of intelligence. In a state of domestication, it is capable of becoming very docile. In the s. of Europe, it is generally managed by a ring passed through the cartilage of the nose, but in India by a mere rope. The Indian driver rides upon a B.; but these animals keep so closely together as they are driven along, that, if necessary, he walks from the back of one to that of another perfectly at his ease. In a wild state, the B. is savage and dangerous, and even in domesti-

cation it is apt to resent injury. The native princes of India make buffaloes and tigers fight in their public shows; and a B. is more than a match for a tiger. If a tiger is encountered by a herd, he is quickly gored or trampled to death.

The B. is used in some parts of the east in the shooting of water-fowl, being trained to the sport, and sold at a considerable price. The sportsman conceals himself behind the B., which, being a familiar sight, is not alarming to the birds.

The CAPE B., *Bos Caffer*, is generally regarded as a distinct species. It seems never to have been reduced to the service of man, although there is reason to believe it to be very capable of domestication. The horns are very large; they spread horizontally over the top of the head, and are then bent down laterally, and turned upwards at the point. The head is carried, as by the common B., with projecting muzzle and reclining horns, but the bases of the horns nearly meet on the forehead, where they are from 8 to 10 in. broad. The length of a full-grown Cape B. is about 8 ft. from the root of the horns to the tail, and the height 5½ ft. This animal, regarded as the most formidable in South Africa, is still found in large herds in the interior. The hide is so thick and tough that the Caffres make shields of it, and the balls used in shooting B. are mixed with tin, and yet are often flattened by the resistance. The Cape B. grazes chiefly in the evening, and lies in woods and thickets during the day.

An attempt has been made to establish a genus, *bulalus*, having the common B. for its type; but the characters lack precision, and the limits are uncertain.

**BUFFALO**, a co. in s. centra! Nebraska, on the Platte river, and intersected by the Union Pacific r.r.; 882 sq.m.; pop. '90, 22,162; soil fertile. Co. seat, Kearney.

**BUFFALO**, a co. in southern S. Dakota; on the Missouri river, and watered by Soldier, Crow, Campbell, and Elm creeks; created, 1864, when it included nearly all of Dakota; organized 1871; area, 510 sq.m.; pop. 1890, 998; industry, farming. Co. seat, Gann Valley.

**BUFFALO**, a co. in w. Wisconsin, on the Mississippi, Chippewa, and Trempeleau rivers, and drained by B. river; 657 sq.m.; pop. 1890, 15,997; surface irregular; products, grain and wool. Co. seat, Alma.

**BUFFALO**, capital of Erie county, N. Y.; third city in the state in population and importance, is at the eastern extremity of Lake Erie, at the head of Niagara River, twenty miles above Niagara Falls, where Buffalo Creek enters the Lake. It is in latitude 42° 53' east, and longitude 78° 52' west; 589 miles east of Chicago; 182 miles northeast of Cleveland; 352 miles west of Albany; 460 northwest of New York. The Erie Basin, protected by a breakwater, is the western terminus of the Erie Canal.

As early as 1679 this locality was visited by the French under La Salle, and at that time he built the first ship to navigate these waters, a vessel of only sixty tons, called the Griffin. It filled the savages with fear and awe when it sailed away on its first and last voyage, as it never returned from its trip to Lake Huron. In 1687 this admirable location was selected for a settlement by Baron La Honton, and Fort Supposé was erected; in 1783-4 it was a British garrison, under the name of Fort Erie. The settlers began building vessels for war and commerce and the navigation of the Great Lakes was commenced, which has since developed into such gigantic proportions. The spot was included in a tract purchased by the "Holland Land Company" in 1792-98 and in 1801 New Amsterdam was founded by the Dutch. In 1810 the name was changed to Buffalo by act of legislature, supposed to be derived from the immense herds of buffalo that frequented the locality for water. During this year the first steamboat called Walk-in-the-Water started westward from the city, and was quickly followed by many others. In 1813 Buffalo was incorporated and made a military post, and December 30th it was surrendered to the British, who devastated and burned it. In 1815 it was rebuilt, but its growth was slow till 1825, when the opening of the Erie Canal materially advanced its prosperity. In 1832 it became a city, and since 1857 it has been noted for its manufactures and commerce. Its harbor is guarded by Fort Porter, and a tall lighthouse guides its shipping into safety.

With an altitude of 600 feet above the sea-level, a mean summer temperature of 67.29°, a mean winter temperature of 26.77°, the climate is delightful. The ground rises gradually from the Lake shore to the height of fifty feet, when it forms an extended plain, from which a fine view of the city, Lake, Niagara River, and surrounding country may be obtained. At one spot the ascent is by a precipitous bluff, which adds to the picturesque effect of the scene.

Although finely located for a great commercial centre, Buffalo had, originally, no facilities for harboring vessels. By a series of breakwaters north and south of the mouth of Buffalo Creek or Inlet, an inner harbor is formed, protected in front by another breakwater, erected by the United States Government. Numerous and extensive substantial piers, forming basins and canals, have been constructed by the State at the expense of millions of dollars; the uniform depth of the water being sixteen feet. Buffalo has a magnificent water-front of about eight miles, two and a half on the Lake, and the same on Buffalo River, with room for extension down Niagara River for some miles. Buffalo River is navigable for two miles, and two canals pass along the western

boundary between the city and the River and Lake, the Erie running to the north of Buffalo Inlet, and a ship canal, six miles long, to the south of it. The streets are broad, well paved with stone or asphalt, and cross each other mostly at right angles. The principal ones, Main, Delaware and Niagara, are five and six miles long and 120 feet wide, lined with costly dwellings and beautiful shade trees. There are more than fifty miles of street railroads, and a steam belt-line for suburban traffic. It has an efficient fire and police department, telephone service, and gas and electric lights. Water is pure and abundant, and the sewage is carried off by tunnel into Scajaguada, Buffalo and Cazenovia Creeks, thence to Niagara River. Buffalo claims to be the cleanest, healthiest and best-lighted city in the United States. There are many squares and public places, and a combination of parks and pleasure grounds, with connecting boulevards, affords a continuous drive of more than fifteen miles. The principal park in the city covers an area of 330 acres, has a large lake and groves of forest trees. The Parade Ground contains fifty-six acres; the Front, on the Niagara, thirty-two acres. Falconwood and Oakfield, on Grand Island, are fashionable club grounds. Near the Park is one of the best driving courses in the country. There are more than twenty cemeteries and a crematory.

Many elegant public buildings adorn the city. Among these are the new Post Office and Custom House, which cost \$2,000,000; the State Armory and Arsenal; the City and County Hall, with tower 245 feet high, and costing over \$2,000,000; Music Hall; Merchants' Exchange; Y. M. C. A. Building; Fitch Institute; General Hospital; Buffalo Library, Niagara Hotel; Board of Trade Building; State Insane Asylum, which has a front of 2700 feet, and cost \$3,000,000, and the Roman Catholic and Protestant Episcopal cathedrals. The principal public monuments are the Soldiers and Sailors, Lafayette Square, and those to Red Jacket and President Fillmore in Forest Lawn Cemetery.

Buffalo has several discount banks, including 2 national, and savings banks, and building and loan associations. Besides the two cathedrals there are nearly 260 churches. Among the charitable institutions are Fitch Institute, containing within its walls a *crèche* and other charities, all managed by the Charity Organization Society, the oldest of the kind in the United States; the Orphan Asylum; Home for the Friendless (Prot.); St. Vincent's (Rom. Cath.) Orphanage for girls; St. Joseph's (Rom. Cath.) for boys; State Asylum for the Insane; Church Home (Prot.) for aged women; St. John's Orphan Home; Ingleside Home for erring women; St. Mary's Asylum for widows and foundlings; St. Mary's Institution for deaf mutes; an eye and ear infirmary; a dispensary, and five hospitals.

Educational institutions are numerous and efficient. There are a State Normal School; 68 public school buildings; public school property valued at over \$2,500,000; two medical colleges; St. Joseph's and St. Canisius' Colleges (Rom. Cath.); Buffalo Seminary, Academy of the Sacred Heart, Holy Angels' Academy, etc. There are 13 reference and free public libraries, including the Y. M. C. A., the Grosvenor (reference), and the German Young Men's Association. The Buffalo Library building is also occupied by the Historical Society, with a large library and cabinet, and the Society of Natural Sciences, which has an extensive collection and large museum. There are also a Historical Society, Law Library, an Art Gallery, and a Decorative Art Society. Of 64 periodicals, 11 are daily, 26 weekly, 28 monthly, and 3 quarterly.

The leading places of amusement are Grand Central Opera House, Music Hall, the Academy of Music, and the elegant Star Theatre. There are sixteen musical organizations, including the Liedertafel, one of the oldest in the United States, and the Philharmonic.

Buffalo's manufacturing interests are extensive and varied. Foundry and machine shop products, including stoves, nails, etc., and agricultural implements valued at nearly \$7,400,000, take the lead, and in the production of these this city ranks next to Pittsburg. Slaughtering and meat-packing amount to \$7,700,000; clothing of men and women, to \$4,800,000; flouring and grist-mill products, \$3,660,000; brick, stone, lime, and stucco, \$3,000,000; refining petroleum, \$1,800,000; malt and distilled liquors, \$3,275,000; soap and candles, \$2,100,000; furniture, \$1,600,000; shipbuilding, \$1,150,000; tobacco and cigars, \$900,000. Besides these are immense establishments manufacturing saddlery and harness, cars, awnings, tents, sails, willow-ware, carriages, wagons, cutlery, hardware, mattresses, refrigerators, jewelry, hosiery, patent medicines, surgical appliances, etc. Total number of establishments in 1890, 3,565; capital invested, \$70,707,145; 51,433 persons employed; total value of products, \$100,052,208.

Buffalo is the great commercial centre of all this section of the country, and having many advantages as a residence, its ratio of increase has been unprecedented. It is connected by several great steamship lines and innumerable independent vessels, with the chief ports on the Great Lakes, and there are several ferries to Victoria and Fort Erie on the Canada side. This city is not only connected with the tide-waters of the Hudson by the Erie Canal, but is the terminus or connecting point of more than a score of railroads; among them are the Lake Shore and Michigan Southern; Canada Southern branch of the Michigan Central; a branch of the Grand Trunk of Canada; New York Central; West Shore; Delaware, Lackawanna and Western; New York, Lake Erie and Western; Lehigh Valley; Western New York and Pennsylvania; Buffalo, Rochester and Pittsburg; and New York, Chicago and St. Louis. The transfer yards at East



Buffalo are the largest in the world. The International Bridge across the Niagara at Buffalo cost \$1,500,000.

The records of navigation for many years show that the Lake opened at dates ranging from March 16th to May 3d; that for seven years the canal opened in May (7th-11th); that with one exception it closed every year in December, and from 1839-87 regularly on Dec. 1st. Buffalo River and the Ship Canals furnish the principal facilities for loading and unloading vessels, affording about twenty-seven miles of dock front.

A Board of Trade was organized in 1844 and incorporated in 1857. The immense quantity of flour and grain annually moved from the Western States to the sea-board constitutes the most important feature of the commerce of Buffalo, and the facilities for handling and storing it are unexcelled by those of any other American city. The first grain elevator in the world was built in Buffalo in 1843 by Joseph Dart. In 1887 there were thirty-three, with storage capacity of 13,015,000 bushels; in 1890, forty-five, storing 16,000,000 bushels. Many of these elevators are costly structures of stone, or of iron and brick; several have grain "driers" attached. The "Niagara B" elevator will store 1,200,000 bushels; the "Bennett" has an hourly capacity of 19,000 bushels.

During the fiscal year 1895-6, the imports of merchandise were valued at \$8,292,277, and the exports at \$4,429,084—total foreign trade, \$7,721,361. The entrances of shipping at the Buffalo Creek custom house were 380 American sailing vessels of 69,015 tons, 461 American steam vessels of 229,739 tons, 206 foreign sailing vessels of 80,467 tons, and 130 foreign steam vessels of 11,806 tons—total vessels, 1,177, total tonnage, 341,026. The clearances were 360 American sailing vessels of 56,221 tons, 405 American steam vessels of 153,217 tons, 200 foreign sailing vessels of 28,406 tons, and 121 foreign steam vessels of 7,702 tons—total vessels, 1,066, total tonnage, 245,546; grand total, vessels, 2,263, tonnage, 586,572. Including vessels registered at other ports on the great lakes and those belonging to local corporations, the shipping engaged in the foreign and domestic trade of the city exceeds 10,000 vessels. The largest article of trade is grain, of which 20,236,114 bushels were shipped by canal in 1895, and 94,287,770 bushels by railroad. The live-stock trade ranks second, in which Buffalo is next to Chicago; the lumber and timber trade follows; and then the coal trade.

Among the imports not specified above are copper and copper-ore, iron and iron-ore, lead, flax seed, lard, pork, salt, fresh and salt fish, hides and skins, scrap-iron and steel, staves, railroad-ties, wool, oil-cake and petroleum, pig, bloom and bar-iron, rock and superphosphates, stone and lime. The principal articles of export besides those mentioned above are plaster, cement and railroad-iron, oil meal and cake, lime and clay, refined and crude petroleum, rock and superphosphates.

The city is governed by a mayor and common council, a treasurer, comptroller, city attorney, superintendent of education, city engineer, overseer of the poor and three assessors. The Erie County Penitentiary, one of the six penal establishments of the state, is located in Buffalo. Fort Porter, although dismantled, is a military post, and a regiment is stationed there. A small yield of natural gas has been secured near Black Rock, but it is piped from Pennsylvania in sufficient quantity to be of service, to some extent, for domestic purposes.

The assessed valuation in 1895 was \$234,651,400; net debt, 1896, \$11,972,850.

Population in 1820, 2095; 1832, 15,000; 1860, 81,129; 1880, 155,134—51,268 foreign, 25,548 German; 1892, 278,796.

**BUFFALO BUG.** See CARPET BUG.

**BUFFALO'RA**, a small t. of Lombardy, about 25 m. n.n.w. of Pavia, on the Ticino, here crossed by a bridge. The Austrians commenced the Italian campaign of 1859 by entering Piedmont at this point. The bridge was partially blown up by Austrian engineers. Pop. 1250.

**BUFFER, BUFFING APPARATUS**, an arrangement like a cushion or plate projecting from the frame of a railway carriage. Buffers are fastened by rods to a spring of flat steel plates, in pairs at each end of the carriage under the framework, to deaden the effect of the concussions caused when the velocity of a part of the train is checked. The buffers, rods, and springs taken together are sometimes called the *Buffing apparatus*, or *Buffing arrangement*. It also allows the engine, in starting a train, to overcome the inertia of the several cars successively. See VESTIBULED TRAINS.

**BUFFET**, an article of furniture formerly serving the same purpose as a sideboard, which has now superseded it. B. is the name given in France to a refreshment bar.

**BUFFIER, CLAUDE**, 1661-1787; a French psychologist and metaphysician, for the most of his life a lecturer in the Jesuit college in Paris. His best-known work is *Traité des Vérités Premières*, in which he intended to discover the ultimate principles upon which all knowledge is based. He wrote also on the elements of metaphysics.

**BUFF LEATHER** is usually made out of salted and dried South American light ox and cowhides. After being limed, they are unhaired and rounded. The grain and flesh are scraped or cut off, and the true cuticle alone remains. The hide is next heated with cod oil and stocked, then partially dried, then oiled and stocked again; the work occu-

pying about a week. The hide is then "beated off" in a stove, then scoured and soaked in lye of carbonate of potash to abtract the oil. It is again stocked, dried, and "grounded" or rubbed smooth with a round knife and with pumice-stone and sand. F. leather is very pliant, is not liable to crack or rot, and is used for soldiers' belts, etc. The natural color of the leather is light-yellow, but it is sometimes bleached white.

**BUFFO.** See **BUFFOON**.

**BUFFON**, GEORGE LOUIS LECLERC, Comte de, one of the most famous naturalists and writers of the 18th c., was b. at Montbard, in Burgundy, Sept. 7, 1707. He studied law at the college of Jesuits at Dijon, but showed so marked a predilection for astronomy and mathematics, that his father allowed him to follow his own inclinations. At Dijon, he became acquainted with lord Kingston, whose tutor, a man of learning and taste, directed the mind of B. to the study of the sciences. With lord Kingston and his tutor, B. traveled through France and Italy, and came to England, where, to improve his knowledge of our language, he translated Newton's *Fluxions* and Hales' *Vegetable Statics*. In 1733, he wrote several original essays, which gained notice in the academy, of which he had been made a member. His general love of science received a definite impulse toward zoology by his appointment, in 1739, as intendant of the royal garden and museum. Hitherto zoology, consisting of a series of unconnected observations and fruitless attempts at classification, had been commonly regarded by educated readers as a dry study, and by savans as play-work. B. first conceived the idea of making it attractive to the first of these classes, and of securing for it, at the same time, the respect of the second. His plan was assuredly comprehensive enough, since he aimed at nothing less than a collection of all the separate known facts of physical investigation, and a systematic arrangement of these, to assist the author in forming a theory of nature; but B. possessed neither the science nor the patience necessary for such a task. Endowed, however, with a brilliantly rhetorical imagination, and always inclined to deliver himself from doubts and ignorance by sparkling hypotheses, the elaboration of which cost him little trouble, he contrived to produce a work which, if not severely scientific in its method, at least shone with what many then conceived to be the brightest literary luster. However, it is not to be denied that many of his views are very ingenious, although later researches have completely exploded them. The *Natural History* of B. made an epoch in the study of the natural sciences, though it has now little or no scientific value. His attempted explanations of natural phenomena were opposed by Condillac, who, with Helvetius, Diderot, D'Alembert, and others, also ridiculed, with a certain degree of justice, the excessive pomp of style used by Buffon. The most insignificant part of B.'s treatise is the mineralogy, for which he was quite unqualified by the deficiencies of his chemical, mathematical, and physical knowledge. The systematic and anatomical arrangement of the mammalia was executed by Daubenton, the colleague of Buffon. B.'s works passed through numerous editions, and several were translated into most of the languages of Europe. The best complete edition is the *Histoire Naturelle Générale et Particulière*, in 36 volumes (Par. 1749-88.) After receiving several high honors, being elevated to the rank of comte de B. by Louis XV., and treated with great distinction by Louis XVI., B. died in Paris, April 16, 1788. In person and carriage, B. was noble; as a Parisian academician, and a self-complacent, theoretical naturalist, dressed in courtly style, pursuing his pleasant studies in the *allées* of the royal garden, and largely participating in the vices of his time, B. was quite a model of a French philosopher of the 18th century. His son, Henri Leclerc, comte de B., b. 1764, was attached, at the outbreak of the revolution, to the party of the duke of Orleans, and fell under the guillotine. His last words were: *Citoyens, je me nomme Buffon*.

**BUFFOON** (Fr. *bouffon*), a low jester. The Italian *buffo* (from *buffa*, a farce) is the name given to a comic singer in an opera. In the corrupt Latinity of the middle age, *buffa* meant a slap on the cheek; and in the Italian, *buffare* signifies the puffing of wind through the mouth. It is probably from the favorite trick played by clowns in farces—one swelling out his cheeks with wind, the other slapping them, so as to make a ludicrous explosion—that the terms *buffones* in Latin, *buffoni* in Italian, *bouffons* in French, and in English *buffoon*, were derived. In Italy, the *buffo cantante* is distinct from the *buffo comico*; the former having greater musical talent, and sustaining a more important part, the latter having greater license in jocoseness. The voice of a *buffo cantante* is generally a bass, but sometimes a tenor buffo is introduced.

**BUFORD**, JOHN, 1826-68; b. Ky.; graduate of West Point, was capt. of dragoons in 1850. In the late civil war he served on the union side, and was one of the most conspicuous and useful of cavalry officers, participating in many engagements, in one of which he was wounded. He rose to maj.gen. of volunteers.

**BUFORD**, NAPOLEON BONAPARTE, 1807-83; b. Woodford co., Ky.; military officer; graduated at the U. S. military academy, 1827; resigned from the service, but re-entered the Union army, 1861; was brevetted major-general of volunteers, 1865; U. S. commissioner of Indian affairs, 1866; and Union Pacific railroad inspector, 1867-69.

**BUG**, a name applied to a large family of insects, *cimicidae*, of the order *hemiptera* (q. v.), sub-order *heteroptera*, and often still further extended in its signification so as to

include the whole of that sub-order, the insects of the section *geocoris* being designated land-bugs, and those of the section *hydrocoris*, water-bugs, the latter including water-scorpions, boat-flies, etc. All these insects, and particularly the land-bugs, although some of them are radiant in beautiful colors, have a strong resemblance in form and structure to the annoying and disgusting house or bed-bug (*cimex lectularia*). The statement that this insect was introduced into England with timber brought from America to rebuild London after the great fire of 1666, must be rejected as erroneous; for although it appears to have been comparatively rare in England, it was well known in some parts of Europe long before that time, and is mentioned by Dioscorides. The bed B. is destitute of wings—an anomalous peculiarity, as the insects of its order, and even of the same family, are generally furnished with them. The body is very flat, of a somewhat oval form; the whole insect is of a dirty rust color, emits an offensive odor, and is about three sixteenths of an inch in length; the legs are moderately long, and capable of being employed for pretty rapid motion; the antennæ are thread-like and very slender, about half the length of the body; the mouth is formed for suction alone, and is furnished with a sort of proboscis, which is three-jointed, forms a sheath for the true sucker, and when not in use is recurved under the head and thorax. The B. lurks during the day in crevices of walls, of bedsteads, and of other furniture, but is sufficiently active during the night; and when it finds opportunity, sucks blood until it distends itself. It seems, however, to be capable of subsisting long without food. Young bugs resemble their parents in most things, except size and the want of *elytra*, insects of this order not undergoing such marvelous transformations as those of some other orders. The best preventive of bugs in a house is *scrupulous attention to cleanliness*; but where the nuisance exists, it is not easily removed, and various means are employed for this purpose, of which one of the best and safest is thorough washing with spirit of turpentine, although recourse is even had to washing with a solution of corrosive sublimate.—Other species of B. (*cimex*) suck the blood of some of the inferior vertebrate animals, as pigeons, swallows, bats, etc.; but the greater number of insects of the B. family live by sucking the juices of vegetables. A small species (*tingis pyri*), which sucks the leaves of the pear-tree, is very destructive in some parts of Europe, where it is popularly called the *tiger*. Some of these winged wood-bugs or field-bugs are capable of inflicting very painful wounds. Flying-bugs, “enormous and fetid,” are among the pests of India. Night is the time of their activity. Warm countries generally have winged bugs of great size and beauty; but if touched or irritated, they “exhale an odor that, once perceived, is never after forgotten.” A winged B., as large as a cockchafer, lodges in the thatch and roofing of houses in Chili, and sallies forth at night, like the bed B., to suck blood, of which it takes as much as a common leech.—It is worthy of notice that a species of field B. (*acanthosoma grisea*), a native of Britain, is one of the few insects that have yet been observed to show affection and attention to their young. De Geer observed the female of this species, which inhabits the birch-tree, conducting a family of thirty or forty young ones as a hen does her chickens, showing great uneasiness when they seemed to be threatened with danger.

**BUG, or Bog.** There are two rivers of this name in Russian Poland. The Western B., the largest tributary of the Vistula, rises in Austrian Galicia, and after a course of about 470 English miles, and receiving numerous tributaries, it joins the Vistula at the fortress of Modlin, near Warsaw. It is navigable for a considerable distance. The Eastern B., the Hypanis of the ancients, rises in Podolia, and flows s. into the estuary of the Dnieper. Its length is more than 500 miles. It is navigable for small-craft as far as Wosnessensk. At the junction of the Ingul with the B., stands the city of Nicolalew.

**BUGBEAR.** See BROWNIE; GOBLIN.

**BUGEAUD, THOMAS ROBERT**, was b. at Limoges, France, in 1784. In his 20th year he entered the army as a private. His conspicuous bravery in the Prussian, Polish, and Spanish campaigns gained him rapid promotion. Shortly before the fall of Napoleon, B. was made a col., and in 1815 commanded the advance-guard of the army corps of the Alps. He afterwards retired to his estate, but was called into public life by the July revolution of 1830. He was elected deputy for Perigueux, and gained the esteem of Louis Philippe, who created him a marshal. In 1835, he voted against electoral reforms and universal suffrage, denounced “the tyranny of the press,” and soon contrived to make himself very unpopular. In Dec., 1840, he was appointed governor-general of Algiers. He immediately set about organizing the celebrated irregular force known as the *zouaves*, and in a few years the French arms were everywhere triumphant over the Arab tribes. The cruelty of some of B.’s proceedings excited strong feelings of reprobation at the time, as well in France as in Europe generally. In 1844, he gained a victory over the emperor of Morocco’s forces at Isly, for which he was created duc d’Isly. In the revolution of Feb., 1848, marshal B. had the command of the army in Paris, and would have dissuaded the king from signing the act of abdication; but panic made such counsel useless. Among all the friends of Louis Philippe, marshal B. seems to have been the only man who preserved firmness and presence of mind. When Louis Napoleon became president, he intrusted the chief command of the army of the Alps to B., who died of cholera in Paris, June 10th, 1849.

**BUGENHAGEN**, JOHANN, surnamed *Pomeranus*, or Dr. Pommer, one of Luther's chief helpers in the reformation, was b. at Wollin, near Stettin, in Pomerania, 1485; studied at Greifswald, and as early as 1508 became rector of the Treptow academy. There he lived quietly, fulfilling the duties of his office until 1520, when his religious views were changed by reading Luther's little book, *De Captivitate Babylonica*. B. was now seized, as it were, by the zealous spirit of the reformation, and, to avoid the persecutions of the Catholic party, he betook himself to Wittenberg, where his talents procured for him in succession several high positions. B.'s remarkable philological and exegetical powers were of great service to Luther in his translation of the Bible. In 1525, he opened the controversy between Luther and Zwingli by a treatise against the latter, to which Zwingli ably replied. He possessed a superior talent for organization, establishing churches in Brunswick, Hamburg, Lubeck, and Pomerania. In 1537, he was called to Denmark by Christian III. to reform the ecclesiastical establishments of that country. He accomplished this so admirably, that the Danes to this day consider him their reformer. In 1542, he returned to Wittenberg, and continued his energetic efforts to extend the new theology throughout his native land. He died 20th April, 1558. His best work is his *Interpretatio in Librum Psalmorum* (Nürnberg, 1523).

**BUGHIS**, or BUGIS, a Malay people in the island of Celebes. The merchants of these people do much of the trade of the island and the neighboring seas. Their government is an elective monarchy, the chief ruler being chosen by the nobles and the higher classes. He holds power only during good behavior, and may at any time be voted out of office. The people are represented as being orderly, peaceable, and well behaved; good good workers in iron, copper, cotton, etc.; constructing good houses and durable ships. Their language has been reduced to writing, and they use the common divisions of the year. They also use the magnetic compass and charts. Half a century ago they were represented as cannibals, but they were conquered by the Macassars and compelled to embrace Mohammedanism. In recent years they have settled colonies of their own people in some of the adjacent countries.

**BUGLE**, *Ajuga*, a genus of plants of the natural order *labiata*, having an irregular corolla, with very short upper lip and trifid lower lip, the stamens protruding. The species are mostly natives of the colder parts of the old world, and several are British. The common B. (*A. reptans*) is abundant in moist pastures and woods. Its flowers are generally blue, but varieties occur with white and purplish flowers, which are often introduced into flower-borders. The Alpine A. (*A. Alpina*) is one of the beautiful flowers of the Swiss Alps.

**BUGLOSS**, a name popularly applied to many plants of the natural order *boraginæ* (q.v.), as to the species of *anchusa* or alkanet (q.v.), etc. In some botanical works it is confined to the genus *lycopais*, a genus differing from *anchusa* in little but the curiously curved tube of the corolla, and of which one species, *L. arvensis*, is a common weed in cornfields in Britain. The beautiful genus *echium* is called VIPER'S BUGLOSS.

**BUHACH**. See PERSIAN POWDER.

**BUHLE**, JOHANN GOTTLIEB, 1763-1821; a German scholar and historian of philosophy; a graduate of Göttingen; at an early age occupied a professor's chair at Brunswick. Thence he went to Moscow as professor of ancient languages, and on his return to Brunswick took the chair of natural law, which he held during his life. He edited *Aratus*, and a part of *Aristotle*, and wrote a hand-book of history and philosophy, and a useful history of modern philosophy.

**BUHL-WORK**, or BOOL-WORK, is the name applied to a sort of inlaying of brass scrolls and other ornamental patterns in wood. The name is derived from its inventor, Boule, an Italian cabinet-maker, who settled in France in the reign of Louis XIV. He employed veneers of dark-colored tortoise-shell, inlaid with brass. Cabinets of his manufacture are highly prized, as are also those of his contemporary Reisner, a German, who used a ground of tulip-wood, inlaid with flowers, etc., in darker woods, and varied with margins and bands of light wood, with the grain crossed for contrast. This modification of buhl-work is correctly called Reisner work. For details of the methods of working, see INLAYING and MOSAIC.

**BUHREACH**, or BHARAICH, a t. of Oude, India, the principal place of a district of the same name. It is in n. lat. 27° 34', e. long. 81° 33'—65 m. n.e. of Lucknow. It is an old town, of considerable size, situated in a pleasant wooded plain, on the left bank of the Sarju. The houses are mostly built of mud and covered with thatch; but the mausoleums, mosques, and residences of merchants are of brick and lime-mortar. North-east of the town is the tomb of Selar, a reputed Mussulman saint, to which there is a great concourse of pilgrims annually in the month of May. Pop. '91, 24,000; of district, 1,000,000.

**BUHRSTONE**, a variety of quartz (q.v.), containing many small empty cells, which give it a peculiar roughness of surface, particularly adapting it for millstones. The name is given without reference to geological relations, but it is *kein quartz*, rather than true *quartz rock*, which ordinarily assumes the character of buhrstone. There are different varieties of B., some of which are more compact, or have smaller cells than others; and those in which the cells are small and very regularly distributed, about equal in diameter

to the spaces between them, the stone being also as hard as rock-crystal, are most esteemed. Good B. is found at Conway in Wales, and at several places in Scotland; but the finest millstones are obtained from the quarries of La Ferté-sous-Jouarre, in the department of Seine-et-Marne, near Paris. A single millstone in one piece of 6 ft. diameter, sells for about \$250, and one formed of several pieces for about \$160. It is not unusual to form millstones of pieces of B. cut into parallelopipeds, like great wedges of soap, and bound together by iron hoops. The stone is found in beds or in detached masses, and the mode of quarrying is peculiar. When the mass is large, it is cut out into the form of a huge cylinder; around this, grooves are cut, at distances of about 18 in., the intended thickness of the millstones; into these grooves wooden wedges are driven, and water is thrown upon the wedges, which, causing the wood to swell, splits the cylinder into the slices required.—Millstones are not always made of B., but sometimes of silicious gritstones, of sandstone, and even of granite. B. millstones are extremely durable. They are quarried in New York, Pennsylvania, and North Carolina.

**BULL, BERNARDO**, abt. 1450–1520; a Spanish Benedictine monk, in 1493 sent as apostolic vicar to the new world, accompanying Columbus on his second voyage. In 1495, he returned to Spain, and was one of the foremost in pressing charges against the unfortunate discoverer.

**BUILDING**, the art of erecting or building houses and other edifices, in which several distinct professions are usually and more immediately concerned. At the head of the building-trade is the architect, who is employed to draw plans and make out specifications of the work to be performed. The builder acts ministerially; his duty consists in carrying out the plans put into his hands, according to certain stipulated terms. The profession of the architect demands not only much imaginative power, but great artistic skill, along with a practical knowledge of details. Endeavoring to realize the wishes of his employer, the architect devises what shall be the external effect and interior accommodation of a building, and portrays the whole on paper with rigorous accuracy. Besides general designs to give an idea of the structure and its interior arrangements, he furnishes the working-plans or drawings, which are to guide the different mechanics—masons, joiners, etc.—in their several operations. These services of the architect, of course, involve much thought and labor, and he is therefore under the necessity of employing a staff of assistants, by whom the plans are executed under his orders. The making out of the specifications is a matter of careful study. To perform this part of his duty properly, the architect needs to be acquainted with the qualities of different kinds of materials; such as stone, lime, sand, bricks, wood, iron, etc. A knowledge of the strength of timber is particularly desirable. When the specifications are made out, they and the contract are subscribed by the builder. To insure as far as possible a faithful adherence to the specifications, the architect appoints a “clerk of works” to keep watch over the whole operations, and who is authorized to check any seeming fault. During the whole proceedings, the architect is paramount. For the due execution of his plans, he feels that his professional reputation is at stake; and, accordingly, having involved his responsibility, the employer cannot with propriety interfere to make alterations while the work is in progress. Such is the etiquette of the profession. Should alterations be desirable, they become matter for a fresh agreement among the parties. When the works are finished, the builder hands his account to the architect to be examined and checked. If satisfied of its correctness, he grants a certificate of the fact, and this is the warrant for payment by the employer. The builder having been settled with, the employer now pays the architect’s fee, which closes the transaction. This fee may be one, two, or more per cent on the entire cost of the B., according to local usage or terms agreed on; whatever it is, it covers all charges for advice, plans, and other professional trouble.

Builders undertake work by “contract,” or by “schedule of prices.” If by contract, they engage to execute the whole works for a stipulated sum. If by schedule of prices, they agree to abide by the measurements of valuers appointed by the architect. These valuers go over the works when finished, and, taking an exact account of everything, compare it with the account rendered by the builder; the architect being the ultimate referee. It is exceedingly important, for the sake of an amicable adjustment of accounts, that the builder should adhere scrupulously to the letter of the specifications—i.e., the covenant under which he has become bound. He can justify no departure from the specifications, on the plea that something as good has been given or done, or that he was not checked at the time by the clerk of works. Being explicitly a person employed to do a certain piece of work, in a certain way, he is in no respect entitled to substitute his own notions for those of his employers.

It may happen that a proprietor acts as his own architect, and employs a builder to execute his designs, on the understanding that he is to pay for everything according to a schedule of prices. In many instances, the builder is proprietor as well as architect, and merely carries out his own plans. Such is generally the case in the neighborhood of London, where builders speculate in leasing land and erecting rows of dwellings for sale. This plan is greatly facilitated by the opportunity of buying every article required in house-building ready for use, such as bricks, door-steps, hearthstones, joists, flooring, doors, windows, marble mantel-pieces, slates, etc. In fact, house-building in the metropolitan district is very much reduced to a system of purchasing and putting together

certain articles from manufactories and depots. For this kind of business, there may be said to be establishments for the sale of doors and windows, as there are shops for the sale of nails, locks, and hinges.

The application of a comprehensive manufacturing system in the preparation of various parts of a building is observable most particularly in certain establishments of great magnitude. The test is this—whether the builder conducts so gigantic a trade as to warrant him in setting up a steam-engine of great power, and in providing highly wrought machines for cutting and otherwise treating wood, stone, etc. When once this degree of magnitude is reached, the operations are conducted under very great advantage. The Crystal palace in Hyde park could never have been built at the stipulated cost, nor in the required space of time, but by the application of steam power to work the machines which shaped and grooved the *two hundred miles* of sash bars; by the resources of the largest English establishment in the glass-trade, in making 1,000,000 sq. ft. of sheet-glass; and by the skill and capital of our great iron manufacturers, in rapidly producing 8000 iron columns, and more than that number of iron girders. When the late Mr. Thomas Cubitt was engaged in the vast building operations at Belgravia (a district in the w. of London owned by the marquís of Westminster), his factory on the banks of the Thames was the most complete ever known in the trade. It exemplified both the principles adverted to above—the manufacture of various articles by steam-worked machinery; and the collecting of large stores of other articles made in a similar way by other firms. There was a store of drawing-room and parlor doors, a store of window-sashes, a store of street-doors, and stores of mantel-pieces, stone and marble steps, balusters, slates, knockers, bells, and all the materials for house-building from the coarsest to the finest. There was also observed that systematic gradation of kinds and dimensions which is so much attended to in the higher kinds of machinery, and which so much expedites all operations; seeing that one particular piece would not only fit into or against another, but into or against any one of a whole class to which that other belonged. A house built in this systematic way partakes a good deal in the nature of a large machine, in which all the parts fit together with very great accuracy. There can be little doubt that if skill and capital be judiciously applied in this way, a house ought to be better built and to cost less than if built in the ordinary unsystematic manner. It may also be mentioned here that Mr. Cubitt was the owner of a very large brick-making establishment on the banks of the Medway, between Rochester and Maidstone, where steam-power was employed in all the operations of making bricks. Some of the great railway contractors, who have become millionaires, were originally house-builders, alive to the grand results producible by the combination of steam-worked machinery with the labor of well-organized bodies of men.

As an art, B. is of vast antiquity, and has assumed different forms, according to the necessities of mankind and the materials readily at their disposal. In ancient Egypt, Greece, and Italy, B. in stone rose to a high state of perfection, and till the present day it may be said that the greatest progress in the art is made only where stone of a manageable kind is conveniently at command. Rome, Paris, Lyons (with very many Italian and French cities), Bordeaux, Brussels, Munich, Geneva, Vienna, Edinburgh, and Glasgow are specimens of what may be achieved in stone workable with the chisel; Aberdeen is mainly built of granite. On the other hand, London, the greatest city within the bounds of civilization, is built of brick; so likewise are Manchester and Liverpool; also Amsterdam, Rotterdam, and other towns in Holland; and as a general fact, it would appear that wherever brick has to be resorted to, there the allied arts of architecture and building, as regards domestic accommodation and elegance of style, are on a poor scale. B. with stone of a superior kind has become very common in New York, Philadelphia, and most other American cities. It is not necessary to trace in this article the various processes embraced in the comprehensive term BUILDING; seeing that all the materials used, and all the operations conducted, are noticed under the proper headings in the cyclopædia.

**BUILDING ACT FOR LONDON AND ITS NEIGHBORHOOD.** See METROPOLIS LOCAL MANAGEMENT ACT.

**BUILDING LEASES.** In the law of England, a building lease is a demise of land for a long term of years, the lessee covenanting to erect certain houses or edifices thereon, according to specification. By the 19 and 20 Vict. c. 120, amended by the 21 and 22 Vict. c. 77, and which acts also apply to Ireland, the court of chancery is empowered to authorize leases of settled estates and B. L., which shall take effect in possession within one year next after the making of the same; the term for such building lease being 99 years; or where the court shall be satisfied that it is the usual custom of the district, and beneficial to the inheritance to grant B. L., for longer terms, then for such term as the court shall direct. By a subsequent enactment, it is declared that the term building lease shall include a repairing lease, but such repairing lease to be for a term not exceeding 60 years.

By the 5 and 6 Vict. c. 108—passed to enable ecclesiastical persons to grant long leases for building, repairs, or other improvements—it is enacted that any ecclesiastical corporations, aggregate or sole, excepting as mentioned in the act, may, with consent of the *ecclesiastical commissioners for England* (q.v.)—to which, where the lessor is

incumbent of a benefice, the consent of the patron also must be added—demise by deed the corporate lands or houses for any term not exceeding 99 years, to take effect in possession and not in reversion, to any person willing to improve or repair the same; provided that on the grant of such leases, a small rent may be reserved during the six first years, with an increased rent afterwards; but no such lease is to comprise the usual house of residence, its out-buildings, or pleasure grounds. While there is nothing in the law of the U. S. to prevent building leases, their use is very infrequent. Lands are frequently leased for purposes of building, and even for as long terms as 99 years, but there is almost invariably a clause in the lease providing that when the term shall have expired it may be renewed by the lessee or his assigns at their option. In such case it is usually provided that the amount of the rent to be paid for the new term shall be a certain per cent. of the value of the property. If the lessee or lessor do not wish to renew the lease then one or the other shall sell, the landlord having his option. The values in such case to be ascertained by three disinterested real estate owners of the vicinity. These provisions, of course, vary in different communities, and may in any instance be whatever may be agreed upon by the parties. See **LEASE**, **LEASEHOLD**, and **GROUND-RENT**.

**BUILDING SOCIETIES.** See **BENEFIT SOCIETIES**; **CO-OPERATION**.

**BUILDING STONE.** The chemical composition of B. S. varies. The majority of kinds are more or less silicious, and are designated sandstones. These consist of particles of sand, united together by the force of cohesion, and by a small proportion of a natural cement; in some cases, ferruginous, consisting of a compound of iron; and in other instances, calcareous, composed of carbonate of lime. Igneous rocks furnish very durable B. S., though in general the hardness of the materials renders them so difficult to work, that they are seldom resorted to where softer stones can be procured. Thus, granite is largely employed in the construction of the houses in Aberdeen, in the erection of bridges, in the paving of streets, and wherever great durability is required. Greenstone and basalt are also occasionally used. The B. S. employed in the new houses of parliament is a magnesian limestone, or a double carbonate of lime and magnesia, which is very close and compact in texture, and is soft enough to be easily cut with the chisel; unhappily it has not proved firm enough to resist weathering, having already shown signs of decay. The other forms of carbonate of lime exhibit considerable durability. Near Bath and in the isle of Portland, an oolitic limestone is quarried, which is easily cut, and stands well.

A very convenient and accurate way of determining the durability of a B. S.—in other words, its power of resisting the effects of frost and other atmospheric agencies—is to place a small block in a cold saturated solution of sulphate of soda; raise to the boiling-point, so as to expel air from cavities in the stone, which then become filled with the solution; then allow to cool, and suspend the block of B. S. in air. Every now and then, it is dipped into the solution, and subsequently air-dried. The result is, that the sulphate of soda crystallizes on the outside and partially in the interior of the block, and in this respect acts as water does when it is frozen during winter; and if the B. S. be porous, and liable to decay by natural agencies, it gradually breaks up, and particles scale off. The amount of this corrosion can be determined by weighing the detached portions. Some building stones contain iron pyrites in little nodules diffused here and there throughout the mass, and such become discolored from the pyrites being decomposed by atmospheric influence, and the brownish-red oxide of iron (rust) is left as a stain on the surface of the block. The liability to decay or to discoloration in a B. S. may be arrested to a great extent by coating the outer surface with boiled linseed-oil, which communicates a dark appearance to the stone, but prevents oxygen or moisture from gaining access to the block. Ordinary oil-paint is employed for the same purpose. for the preservation of B. S. from decay by means of various solutions, see **STONE**, **PRESERVATION OF**. See Gillmore's *The Strength of the Building Stone of the United States* (1874).

**BUITENZORG**, a t. in Java, 66 m. s. of Batavia, with which it has railway communication. It is in a fine situation, 800 ft. above the sea, and is a favorite residence for Batavia's rich men. The country palace of the governor-general is one of the chief buildings, and there are a mansion for the regent, a garrison church, and mosques. The botanical gardens, laid out in 1817, are among the best in the world. In the neighborhood is a sacred forest held in great veneration by the natives.

**BUJALANCE**, a city of Andalusia, Spain, about 20 m. e. of Cordova. It is surrounded by a moat and a wall flanked with old towers, has an old Arab castle, and manufactures of woollens, glass, and pottery, exports of agricultural produce, and an important annual cattle-fair. Pop. about 10,500.

**BUKKUM WOOD.** See **BRAZIL WOOD** and **SAPAN WOOD**.

**BUK'KUR**, a fortified island of the Indus, in Sind, in lat. 27° 39' n., and long. 68° 56' e. It is 400 yards from Roree, on the left bank, and 100 from Sukkur on the right. In the ordinary state of low water, the western and eastern arms of the river are respectively 15 ft. and 80 ft. deep. In particularly dry seasons, however, the former has been known to disappear altogether, and even the latter is said to have occasionally been

fordable. In 1839, a British force, on its march to Afghanistan, made a stepping-stone, as it were, of B. in crossing the Indus, having joined it to either mainland by a bridge of boats. B. is no longer of any military value against a civilized assailant, commanded, as it is, on both sides by higher grounds. It is composed of limestone, being 800 yards long, and 300 broad, and rising 30 ft. from the average level of the stream.

**BUKOWINA**, a duchy in the Cis-Leithan (non-Hungarian) section of the Austrian empire, on the Russian frontier; area, 4035 sq.m.; pop. '90, 646,691 (of whom the leading nationalities are Ruthenians and Roumanians). It has a local Diet of 81 members, and sends 9 members to the Reichsrath, being one member for every 71,843 inhabitants. The leading religion is the Greek. It became a "crown land" in 1849, having previously formed a part of Galicia. It is traversed by offsets of the Carpathians, gives rise to many rivers, and abounds in wood, along with considerable mineral riches. Wood-cutting and mining afford occupation for a great number of the inhabitants. Large numbers of cattle are reared, and also excellent horses. B., till the end of the 15th c., belonged to Transylvania, when it came under the dominion of the Turks, from whom it was acquired by Austria in 1775. Czernowitz is the chief town.

**BULACAN**, a t. of Luzon, Philippines, at the head of the bay of Manila, about 20 m. n.w. of the city of that name. B. is chiefly composed of wooden houses, but has spacious streets, manufactures of silken mats and other fabrics, and large sugar-boiling establishments. Pop. about 12,000.

**BULAMA**, the most easterly of the Bissagos islands off the w. coast of Africa; 11° 34' n., 15° 33' w.; 18 by 9 m.; fertile and heavy wooded, but insalubrious. There is a good harbor. An English colony was sent here in 1792, but nearly all soon fell victims to the climate.

**BULAU**, or *Tikus Gymnura rafflesi*, vig., an animal in Sumatra, of the mole family resembling the opossum. The body is 12 to 14 in. and the tail 9 or 10 in. long. It is about 5 in. high at the shoulder; color black and white, with a black stripe over each eye; the fur mixed with long bristly hairs, and tail nearly naked. It feeds on insects, and secretes a strong odor of musk.

**BULB**, in botany, a subterranean bud covered with imbricated scales, having at their base a flattened disk, which represents the proper stem of the plant, and from which the roots proceed downwards, whilst from the midst of the scales an annual herbaceous stem and leaves are sent up. The scales are regarded as modified leaves, and sometimes are all fleshy, as in the lily; sometimes the outer ones are membranous, as in the onion, in which case the B. is said to be *tunicated*. The B. is popularly but erroneously regarded as the root or part of the root of the plant, and plants in which it is found are very generally described as *bulbous-rooted*. New buds are formed in the axils of its scales, which grow at the expense of the parent B., and gradually destroy it. In some plants, as the tiger-lily and some species of allium, leaf-buds (*bulbils* or *bulblets*) are developed on the stem above-ground, which spontaneously separate and serve for the propagation of the plant, and which are entirely of the nature of bulbs, being formed of thickened scales, sometimes so closely united as to form a solid mass. The **CORM** (q.v.) was formerly regarded as a kind of B., and described as a solid B., but its structure is essentially different, although both it and the **TUBER** (q.v.) may be included in the description which Linnæus has given of the B. with reference to the purpose which it serves as "the winter-quarters of the plant." Many bulbs, if removed from the ground during the period when the vegetation of the plant is most dormant, may be kept in a dry place without injury for a considerable time, even for years. Bulbs serve also for the preservation of plants in periods of drought, and are particularly frequent in those which delight in sandy soils. The abundance of "bulbous-rooted" plants is a remarkable characteristic of the flora of the Cape of Good Hope. "Bulbous-rooted" plants are very often distinguished by the beauty of their flowers, and many of them are among the most esteemed ornaments of gardens, greenhouses, and stoves. The bulbs of tulips, hyacinths, and other favorite flowers are important articles of trade. Some bulbs, as that of the onion, are valuable as articles of food; others, as that of the squill, from their medicinal properties.

**BUL'BUL**, a Turkish name for the nightingale, which has found its way into English poetry chiefly through the patronage of lord Byron. But the same name is given in India to a very different bird, *pycnonotus hamorrhous*, belonging to the great tribe of *dentirostres*, and formerly ranked among the thrushes, to which it is pretty nearly allied. It is a little bird of brilliant plumage, and the male has a crest or tuft on its head. It is remarkable for its pugnacity; the Singhalese consider it the most *game* of all birds.

**BULGA'RIA**, an autonomous principality, tributary to Turkey, which till 1878 constituted the Turkish vilayet of the Danube (Tuna). B. is bounded on the n. by the Danube and the Dobrudscha, now Roumanian; on the e. it has the Black Sea; on the s. the Balkan range; and on the w., Servia and Roumelia. According to a census taken on Jan. 1, 1893, there were 8,809,816 inhabitants, of whom 2,504,398 were Bulgarians, 569,228 Turks, and the remainder in order of numerical importance, Greeks, gypsies, Jews, Germans, and Russians. The area of B. is 24,360 sq. miles. The country slopes terrace-



like from s. to n., and from the w. to the e., acquiring a plain-like character before reaching the Black sea. The rivers are rapid and tributary to the Danube. The soil in some parts is very fertile, producing great abundance of corn; in others, it does not yield sufficient for the consumption. There is excellent pasture-land, and the lower terraces are richly wooded. The chief crop is wheat, which is largely exported. Other exports are wool, tallow, butter, cheese, hides, live stock, flax, and timber. The inhabitants are hard-working, hospitable, and fairly intelligent, but suspicious and greedy; the faith of 70 per cent. that of the Greek church. The prince, freely elected by the people, must be confirmed by the porte with the assent of the powers. The government is Christian, and there is a national militia. The Berlin congress decided that the military importance of B. should meanwhile be decreased by the demolition of all its fortresses. Sofia (pop. 1893, 47,000) is the capital.

The earliest known inhabitants of B. were the Mœsians, who contended long against the Romans, and allied themselves with Gothic and Slavonic tribes against the Greek empire. Anastasius, the Greek emperor, in 507, built an extensive wall to defend his territories from Mœsian invaders. In the 7th c., the Bulgarians, a people of Finnish origin, whose original seat was the banks of the Volga, conquered the Mœsians, and established the kingdom of Bulgaria; they soon lost their own language and customs, and became assimilated to the other Slavonic inhabitants. After being tributary to the Greek emperors, and contending for some time against Hungary, B. became subject to the Porte in 1392; but the frightful oppression of despotic and sanguinary pashas has not, even to the present day, robbed the inhabitants of a distinctively national life and love of freedom. In April, 1876, an insurrection broke prematurely out in B., and was quenched in blood, the bashi-bazouks or Turkish irregulars committing savage excesses. The atrocities in B., taken in connection with the Servian war and the condition of other Christian provinces of Turkey, led to diplomatic intervention; and in December a conference met at Constantinople, but without result. The war of 1877-78, between Russia and Turkey, followed. The congress of Berlin, which revised the treaty of San Stefano, declined to sanction the erection of a Bulgarian principality extending from the Danube to the Ægean. But it constituted an autonomous, though tributary, Bulgaria n. of the Balkans, and to the mainly Bulgarian province s. of them, that of eastern Roumelia (q.v.), it granted administrative autonomy. In 1879 Alexander of Battenburg, a minor German prince, was made sovereign. In Sept., 1885, an independent revolution in eastern Roumelia united that country with Bulgaria. Servia claimed that the Berlin treaty had been violated; and her jealousy of B. led her to invade the latter's territory. After a brief war, an armistice was declared; a conference of the great powers followed, and the Porte consented to the temporary union of B. and eastern Roumelia. In 1886 Alexander was forced by Russia to abdicate, and in the summer of 1887 prince Ferdinand of Saxe-Coburg, against the will of the great powers (especially of Russia), accepted an invitation by the regency to fill the vacant throne. See Dicey, *The Peasant State* (1894).

**BULGARIAN LANGUAGE**, the richest of the old Slavic tongues, used by the Græco-Slavic church, and the chief medium of religious writings in that region. After the fall of the Bulgarian kingdom, about 1400 A.D., the language became mixed with neighboring dialects and lost its purity. In the older literature are found translations of the Bible made in the 10th century. The literature of the present time is of small account, being only such as is found in elementary and doctrinal works. Grammars and dictionaries have been published since 1835, and a New Testament was issued in 1840 for the British and foreign Bible society. The language lives in many native songs.

**BULGARIAN POLITICAL PARTIES.** See **POLITICAL PARTIES, BULGARIAN.**

**BULGARIN**, THADDEUS, a Russian author, was b. in Lithuania, 1789; fought in the campaign against France, but afterwards served under Napoleon. On Napoleon's fall, he devoted himself to literature. He wrote both in Polish and Russian; and ultimately settling in St. Petersburg, became a popular author. He composed several romances—of which *Demetrius* and *Maeppa* are the best—and published different periodicals. He died in 1859.

**BULGARUS**, the most celebrated of the famous "four doctors" of the law school of Bologna. He was a native of that city, and was regarded as the Chrysostom of the gloss writers. He lived to a great age, becoming childish before his death in 1166. B. was one of the most trusted advisers of the emperor Frederick I. The commentary *De Regulis Juris* is his most celebrated work.

**BULIMY**, or **BOULIMY** (Gk. *bous*, ox; *limos*, hunger), a form of disease, chiefly occurring among idiots and maniacs, in which the patient has a perpetual and insatiable desire for food, and often faints if his appetite be not indulged. The disease is also known as *canine hunger*, and is due sometimes to a very irritable state of the nerves of the stomach.

**BULKHEADS**, in a ship, are the partitions between the several portions of the interior; whether to separate it into rooms, or as a safeguard in case of wreck.

*Water-tight B.* are among the improvements in modern ship-building; they are iron walls running athwart the hold, as a means of dividing it into several portions; the interior is thus cut off into cells, each water-tight in reference to its neighbors. When such

a ship is leaking in any one of the compartments, there is thus a chance that the others may be kept dry until the damage is repaired. In iron steamships the water-tight B. are generally placed transversely, but there are frequently longitudinal water-tight divisions also. The number and disposition of the compartments depends on the ship-owner and the ship-builder; but it is now the common practice to place the engines and boilers in water-tight sections, and experience has proved the special value of a collision-bulkhead in the bow.

**BULKLEY, PETER**, 1688-1659; b. England; the earliest minister in Concord, Mass. He was his father's successor at Woodhull, England, but was removed for non-conformity, and in 1685, with a number of other emigrants, founded the Concord settlement. He wrote several Latin poems, and a work called *The Gospel Covenant Opened*.

**BULL** (Lat. *bulia*, primarily, anything round or swelling) was originally the name of the capsule of the seal appended to letters from emperors or from the pope. Afterwards, the word was applied to the seal, and next to the document itself, as in the case of the celebrated golden bull of the emperor Charles IV., which was so named from the golden capsule appended to imperial letters and other important documents by the Byzantine and Frank emperors as early as the 9th century. They are issued by the apostolic chancellor, and are dated "from the day of incarnation," whereas briefs are always dated "from the day of the nativity." The name is now applied exclusively to letters or documents issued in the name of the pope. In cases of granting favors, etc., the seal is appended to the open letter by a yellow or red band of silk; but in the administration of justice, a gray hempen band is used. All bulls, excepting those addressed to the united Greek Christians, are written in Latin with Gothic letters, and on the rough side of the parchment. See **BRIEF**. All bear the name and title of the pope—for example, *Gregorius Episcopus Servus Servorum Dei*, etc., is prefixed; then follows a general introduction, of which the initial words are used to give a distinct name to the B., as in the examples: the B. *Eccursus Domine*, issued by pope Leo X. against Luther in 1520; the B. *In Cena Domini*, the celebrated B. against heretics, often reissued since 1536; the famous *Unigenitus*, or B. against Quesnel's writings, 1713; the *Dominus ac Redemptor Noster*, or B. for the abolition of the order of Jesuits; the *Ecclesia Christi*, or the B. which completed the concordat with France in 1801; the *De Salute Animarum*, or the B. for the regulation of the Catholic church in Prussia. To every B., the leaden seal of the church is appended, bearing on the obverse the arms of the pope, and on the reverse his name. Bulls issued during the interim between the election and consecration of a pope have no armorial bearings on the seal. A *bullarium* is a collection of papal bulls, as the *Bullarium Magnum Romanum a Leone Magno ad Benedictum XIII.* (19 vols., Luxembourg, 1737-58), the *B. Romanum* (28 vols., Rome, 1737-44), and the *B. Benedicti XIV.* (Mechlin, 1826-27), and more recently, the continuation of the *Bullarium Romanum Magnum* by Barberini (Vienna, 1835).—From the same mediæval Latin word *bulia* is derived the word *bulletin* (Ital. *bulletino*), commonly applied to dispatches from generals, reports of the health of royal personages, and on the continent, at least, to other brief authenticated documents, such as those of scientific societies, the best known of which are the bulletins of the St. Petersburg and Belgic academies. It is, moreover, used as a title for periodicals, and, in France, also designates the slips of paper on which electors write their votes.

**BULL**, a ludicrous and unintentional blunder in speech due to the conjunction of contradictory or incompatible ideas. Some would trace the origin of the term to the papal he"s, in which the pope styles himself "the servant of servants," but claims absolute authority over the world. Coleridge, in remarking on the subject, instances the following: "I was a fine child, but they changed me." The Irish are noted for their bulls. See Edgeworth, *An Essay on Irish Bulls*.

**BULL**. See **Ox**.

**BULL, GEORGE**, D.D., a learned prelate and theological writer, b. at Wells, Gloucestershire, England, Mar. 25, 1634; studied at Oxford, whence he retired in 1649, having refused to take the commonwealth oath imposed by the parliament. Receiving holy orders, his first charge was the parish of St. George's, Bristol. In 1658, he obtained the rectory of Suddington St. Mary's, near that city; and in 1662, was presented to the vicarage of Suddington St. Peter's. In 1669, he published his *Harmonia Apostolica*, the object of which was to reconcile the apostles Paul and James on the subject of justification. This work occasioned considerable controversy among divines, and in answer, B. published his *Examen Censurae*, and *Apologia pro Harmonia*. In 1678, he was presented to a prebend in Gloucester cathedral, and made rector of Avening, Gloucestershire. In 1679, he was installed archdeacon of Llandaff, and received the degree of D.D. from Oxford University. In 1685, he published his *Defensio Fidei Nicenae*, against the Arians and Socinians, Tritheists and Sabellians; and in 1694, his *Judicium Ecclesie Catholicae*, for which the thanks of the whole French clergy were sent to him through the celebrated Bossuet. His last work was his *Primitive and Apostolical Tradition*, etc. He was consecrated bishop of St. Davids in 1706, and died Feb. 17, 1710.

**BULL, JOHN**, 1563-1628; an English organist and composer. He was appointed organist in the queen's chapel in 1591, and next year made doctor of music in Gresham

college. Not understanding Latin, he was especially permitted to lecture in English. He visited the continent, and had many offers of honorable and lucrative positions, but declined all, returning to England to be organist to James I. On another visit to the continent he became organist to the cathedral in Antwerp, where he died. The claim that he composed the English national anthem has not been sustained.

**BULL, JOHN**, a familiar synonym for the English people. Its origin is attributed to Dean Swift, but Arbuthnot first gave it literary currency in his *History of John Bull* (1712), a political allegory intended to satirize the duke of Marlborough, and to increase feeling against the war with France. In art John Bull is well known as a burly country squire, impetuous, honest, narrow-minded, dogmatic, and easily imposed upon.

**BULL, OLE BORNEMANN**, a famous violinist, b. in Bergen, Norway, Feb. 5, 1810; d. near there, Aug. 17, 1880. His father, it is said, attempted to force him into the study of theology, and would not permit a musical instrument about the house. This foolish treatment only gave a more decisive character to the peculiar genius of the boy. At the age of 18 he was placed at the university of Christiania, from which he is said to have been expelled for taking temporary charge of the orchestra at one of the theatres. In 1830, he went to Cassel, in Germany, to study under Spohr, but was so coldly received that he devoted himself to the study of law at Göttingen. He was subsequently at Minden, whence, in consequence of a duel, he fled to Paris in 1831. An unsuccessful attempt to drown himself in the Seine was the turning-point in his life. He thereafter acquired the patronage of a lady of rank, and rapidly rose to fame as a violinist. His style of playing was like that of Paganini, who spoke of his technique as masterful. In 1836, he visited England, Scotland, and Ireland, and subsequently traveled in a professional capacity through Belgium, Holland, Russia, and Germany. In 1848 he went to the United States, and became attached to that country. Returning to Norway, his American ideas offended the government, resulting in many lawsuits and the dissipation of his wealth. In 1852 he returned to the United States, and put into practice a scheme long contemplated, which, like most of his business speculations, resulted disastrously. He purchased 120,000 acres of land in Pennsylvania, and attempted to found there a colony of his countrymen. He designed a castle for his permanent home, and erected it on the summit of a mountain, from which there was a commanding view. Before the castle was completed the colonists grew discontented, and about the same time he learned that the title to the land which he had purchased was worthless. Ole Bull relinquished everything, and again had recourse to his violin to repair his bankrupt fortunes. All that remains as a reminder of his grand scheme is the village of Oleana, named after him, which clusters around the base of the mountain capped by the once lordly castle known to this day as "Ole Bull's Folly." After a profitable European tour, he returned to this country, and made his home in Cambridge, Mass. In 1870, he made a happy marriage with a Wisconsin lady. His form was tall and erect, even to old age. Longfellow describes him in his *Tales of the Wayside Inn*. He was gifted with remarkable memory and with social qualities by which he made and retained many friends. On his seventieth birthday, which occurred in Feb., 1880, a surprise party was given in his honor at his home in Cambridge, at which many literary celebrities of the vicinity were present. He was then, to all appearances, strong and healthy. Early in the summer he sailed for his summer residence in Norway, where he died.

He belonged to no school in music, but Mozart was the composer that he cared most to interpret. Joachim criticizes him thus: "No artist in our time has possessed Ole Bull's poetic power; no one has ever surpassed his playing of the adagio." His own compositions and improvisations best exhibited his mastery over his instrument, and were always demanded by the audience. His works include: a Concerto in A (1832); do. in E minor (1841); Quartetto a violino solo (1834); and *Memory of Washington* (1841). See Sara C. Bull, *Ole Bull: A Memoir* (Boston, 1883).

**BULLA**, a genus of mollusca, which in the older systems, founded upon characters taken from the shell alone, contained a heterogeneous assemblage of species essentially very different. Some of those having been removed to other orders, according to their organization, the genus *bulla*, and the family *bullidae*, of which it is the type, are placed in the order *tecidibranchiata* of Cuvier, an order of the class *gasteropoda* (q.v.), and of that section it called *monacea*, having the male and female organs of sex combined in the same individual. The *bullidae* have a convoluted and generally thin shell, which serves as a covering and protection for the gills, and which in some of them is large enough to form a retreat for the entire animal, in others is itself enveloped in the mantle. This shell forms a sort of transition link between the flat calcareous plate inclosed in the mantles of the *aplysia* or sea-hares—to which B. is nearly allied—and the spiral shell of snails and other such conchiferous mollusks. The mouth of the shell is large, extending the whole length of the shell, widening towards one end, the lip acute. The gizzard of the *bullidae* is very muscular; and among its thick coats, in many species, are found calcareous bony plates, which being moved against each other by its muscles, serve to grind down the food. All the species are marine, some are found on the British coast. Some, from their form and fragility, are popularly called BUBBLE SHELLS, as the British *bulla hydatia*.

**BULLACE**, *Prunus insititia*, a shrub or small tree, larger and much less spiny than the sloe, but very closely allied to it, as it is also to the plum, so that many botanists

regard them all as one species, an opinion much confirmed by the circumstance that the varieties pass into each other by imperceptible gradations. The B. may be regarded as a form intermediate between the plum and the sloe. Its leaves, however, are generally broader in proportion to their length than those of either of these, and its fruit-stalks more frequently in pairs; it differs also from both of them in its downy fruit-stalks, and in having the under side of its leaves permanently downy. The flowers are rather larger than even those of the plum; the fruit is larger than the sloe, generally globose, and, although it partakes in some degree both of the acidity and the roughness of the sloe, it is not unpleasant, especially after having been mellowed by frosts, and makes excellent pies or tarts. "A bullace-pie is a standing dish at the harvest-home supper in the south of England, only it requires rather more sugar than the housewife is always willing to allow." The B. is common in hedges, coppices, and banks in England, and in many parts of Europe.

**BULLE** are collections of serous fluids of considerable size, situated immediately beneath the cuticle, and rising from the true skin. They differ from vesicles only in size; and no very definite line can be drawn between a large vesicle and a small bulla. They usually vary in diameter from a quarter of an inch to two inches. They may be followed by crusts or by ulcerations. They constitute a special order of skin-diseases, which includes pemphigus and rupia (q.v.).

**BULLAS**, a t. of Spain, in the province of Murcia, and 26 m. w.n.w. of the town of Murcia. It is situated on a hill, 1840 ft. above the sea. The streets are steep and unpaved. B. has manufactures of linen and hempen fabrics, earthenware, and brandy, and a considerable trade in manufactured goods and grain. Pop. 6700.

**BULL-BAITING**, a barbarous sport, once very popular in England, and in which all classes of society equally delighted, but now, through the progress of civilization, almost entirely confined to the lowest, and rare even among them. It consists in causing a bull to be attacked by dogs; and, in order that the bull might be made as furious as possible, his nose was sometimes blown full of beaten pepper before he was turned loose. Another form of this sport was to fasten the bull to a stake, by a rope of some yards long, and to send bull-dogs against him, one at a time, which were trained to seize him by the nose, and, when this was accomplished, it was called *pinning* the bull. But no small part of the enjoyment of the spectators was derived from the success with which the attacks of the dogs were met by the bull lowering his head to the ground, and receiving them on his horns, often tossing them to a great distance. In some places, bull-baiting took place regularly as a sort of annual festival, and funds were sometimes left to provide for it. King James I. of England greatly delighted in this sport. When the late emperor Nicholas of Russia visited England, before his accession to the empire, he was present at a boxing-match and a bull-baiting, which were got up to show him English tastes.

An equally barbarous sport, termed *bull-running*, was formerly practiced at Stamford and Tutbury, where men and women took the place of dogs, maddened the bull with hideous noise, and then pursued it with "bull-clubs," till it expired.

**BULL-DOG**, a kind of dog which is regarded as peculiarly English, but concerning which it is doubted whether it has existed as a distinct race, at least from the Roman era, or has more recently sprung up, as a variety of the mastiff, or a cross between the mastiff and some other breed. Buffon, indeed, represents the bull-dog as the parent race, and the mastiff as derived from it, but this opinion is generally rejected as erroneous. The bull-dog has been regarded as a distinct species by some naturalists, and named *canis Anglicus*, *C. uniarius*, etc. It is much smaller than the mastiff, but is very strong and muscular. The breadth of muzzle is greater than in the mastiff, and the head is very large, almost appearing as of disproportionate size to the body. "The forehead sinks between the eyes, and the line of the nose rises again at a considerable angle; the lower jaw projects beyond the upper, often showing the teeth, which altogether, with the frequent redness about the eyelids, produces a most forbidding aspect; the ears are partially drooping, unless the terrier blood is crossed in the animal, and the tail is carried high." The hair is short, and the tail taper, and not bushy. The color may be ochry or reddish buff, brindled, fawn, or white, the last being preferred, and should be whole or unmixed, though dogs of two colors are exceedingly common. The bull-dog used seldom to be seen except in the company of persons who delight in dog-fighting and other barbarous sports, but now has sometimes more reputable patrons. It was formerly much employed in bull-baiting, from which it derives its name. It is chiefly remarkable for its savage ferocity, and the pertinacity with which it retains its hold, as if its jaws were locked, and it could not let go. It will hang to the jaw or nose of a bull, although lifted from the ground. Col. Hamilton Smith says he has seen one "pinning an American bison, and holding his nose down, till the animal gradually brought forward its hind feet, and, crushing the dog to death, tore his muzzle out of the fangs, most dreadfully mangled." The bull-dog is also bold enough to attack any animal, however superior in size and strength. See illus., HORSES, DOGS, and RABBITS, vol. VII., fig. 13.

The **BULL-TERRIER** is a cross between the bull-dog and the terrier. It is smaller than the bull-dog, more lively and docile, and equally courageous. The ears are always

pointed; the best color is white, with some black about the head. It is unrivaled in rat-catching. It is a great favorite as the companion of young men.

**BULLDOZING**, a word which first came into general use in 1876, from the local *argot* of Baton Rouge, Louisiana, originally denoting the conduct of a sort of vigilance committee which undertook to prevent the stealing of cattle and stock. The offenders when caught were punished with a dozen lashes from a bull-whip. Hence, the first form of the word was *bull-dozen*. The name soon received an extension of meaning by which it characterized all summary punishment inflicted without due process of law, especially for the purpose of political intimidation. See Norton's *Political Americanisms* (1890).

**BULLER**, CHARLES, 1806-48, English politician, entered parliament before the reform bill and continued a member of the lower house till his death. He was still but a rising man when he died. In politics, a philosophical radical, he occupied successively the posts of judge-advocate general and president of the poor-law commission under whig governments.

**BULLER**, Gen. Sir REDVERS HENRY, English military officer, b. 1839, fought through the Ashantee, Kafir and Zulu campaigns, winning the Victoria cross in the last named for the gallant rescue of a comrade. Later he served in the Boer war of 1881, in the Egyptian war of 1882, and in the Soudan campaign of 1884-5. From 1887 to 1890 he was quarter-master-gen., and in 1891 promoted to the rank of lieutenant-general.

**BULLET** is the leaden projectile discharged from a musket, fowling-piece, pistol, or similar weapon. When the smooth-bore muskets alone were used by British infantry, the bullets were made by casting. Molten lead was poured into molds; and the molds were dipped in cold water, to hasten the solidification of the lead. The molds were cooled after every few times of using; and the lead was heated only just to the degree for maintaining fluidity. Bullets are now, however, made more expeditiously, and more truly spherical in form, by compressing machines, one form of which has been invented by Mr. George Napier. The lead is first fashioned into a rod about a yard long, by five or six eighths of an inch thick; this rod is passed between rollers to condense it; then between other rollers to press it into a row of nearly globular pieces; then a spherical die gives the proper form to each of these pieces; and, lastly, a treadle-worked punch separates them into bullets. With one of these machines and two dies, nine boys can make 40,000 bullets in a day.

Since smooth-bore musketry has given way to rifled arms, the old spherical bullet has been replaced by various forms of elongated projectiles. Many have a base arranged for expansion, being hollow or plugged, with the object in view of forcing the soft lead to spread sufficiently to fit the rifle-grooves and thus to impart to the bullet itself a rotary motion, with the consequent increase in precision and in length of range. Their forms are singularly numerous. Robins' bullet was egg-shaped, with the centre of gravity at the larger end; Beaufoy's was ovoid, with a hemispherical cavity at one end; Manton's was a spherical ball put into a wooden cup, with projections on the exterior; Greener's was oval, with a plug of mixed metal driven into a hole barely large enough for it; Norton's, Delvigne's, Minié's and others, are, or were, of various elongated shapes, mostly with some kind of plug, which, driven into the lead by the force of the explosion, causes it to fill up the grooves in the rifling of the barrel. This expanding or dilating action has been claimed by many inventors; but the English government, in 1857, awarded Mr. Greener £1000 as being the person who had practically solved the difficulty as far back as 1836. Bullets for rifles are now made with extraordinary speed, by machinery of beautiful construction. The machine draws in a coil of leaden rod, unwinds it, cuts it to the required length, stamps out the bullets with steel dies, drops them into boxes, and conveys them away. Each machine, with its four dies, makes 7000 bullets per hour; and four such machines, in an easy day's work, turn out 800,000 bullets. So nearly are the machines automatic, that one man can attend them all. Other machines, attended by children, produce an equal number of little boxwood plugs for filling the cavity at the hinder end of the bullet. See CARTRIDGE and BREECH-LOADING ARMS.

**BULLET-TREE**, or **BULLY-TREE**, a tree found in Guiana, and valued for its wood, which is solid, heavy, close-grained, and durable, and also for its fruit, which is a drupe about the size of a cherry, and very delicious. It is supposed to belong to the genus *mimusops* (natural order *sapotaceae*, q.v.).

**BULL-FIGHT**. Combats of men with bulls, for the entertainment of the public, were common in Greece, particularly in Thessaly, and in Rome under the emperors, though in later times they were forbidden both by emperors and popes. They are still a favorite pastime in Spain and Mexico. In Spain, they were abolished by Charles IV.; but Joseph, Napoleon's brother, re-established them, out of policy, the mass of the Spanish population being passionately fond of the sport. The most magnificent bull-fights were at one time instituted by the monarchs themselves; at present, both in the capital and in the larger towns of Spain, they are held either as private speculations, or for the benefit of public institutions. In Madrid, the bull-fighting season commences in April, and lasts until November. During that time, there is at least one afternoon in every week devoted to the sport. The proceeds go to the funds of the

general hospital. The fights take place in a kind of circus, called the *Plaza de Toros*, round which the seats rise one above another, like the steps of a stair, with a tier of boxes over them. The *Plaza* is capable of containing from 10,000 to 12,000 people, who pay a high price of admission, considering the rate of wages in Spain; and all go attired in their best to the spectacle. The best Andalusian bulls are bred at Utrera, the best Castilian ones on the Jarama, near Aranjuez. The latter are the breed usually chosen for fight in Madrid. They are fiercer and more active, but inferior in strength to British animals. The horses engaged in the conflicts are worthless brutes, fit only for the knacker. The men employed in the fight are generally those who have been bred to it as a profession, but occasionally amateurs may take part in it. The bull-fight has been described as a tragedy in three acts. The principal performers in the first are the *picadores*; in the second, the *chulos* are the only actors; the third and last act devolves solely on the *matador*. The *picadores* are all mounted, dressed like Spanish knights of the olden time, and armed with a lance; they take up their position in the middle of the circus, opposite the bull-stalls. The *chulos*, who are on foot, are gay with ribbons, and wear very bright-colored cloaks; they distribute themselves in the space between the barriers. The *matador*, or chief combatant, is also on foot. He is handsomely dressed, and holds in the right hand a naked sword, in the left the *muleta*, a small stick, with a piece of scarlet-colored silk attached. On a sign given by the chief magistrate, a bull is let out from the stalls; the *picadores* stand ready in the arena waiting his charge. With a brave bull, they find all their skill requisite in acting on the defensive; with a cowardly one, they act on the offensive; and should their stabs be ineffectual in rousing the animal to the requisite fury, the poor beast is hooted by the crowd, and ultimately stabbed ingloriously in the spine. Whenever a horse is wounded, the rider betakes himself to flight; and when either the above casualty happens, or a *picador* is thrown, the *chulos* rush in, and attract the bull by their cloaks, saving themselves, if need be, by leaping over the palisade which incloses the circus. At the same time, another *picador* calls off the bull's attention to himself by shouting. When the bull begins to flag, the *picadores* are succeeded by the *chulos*, who bring with them the *banderillas*—i.e., barbed darts about two feet long, ornamented with colored paper flags, which they stick into the neck of the animal. Sometimes these darts have crackers attached to them, the explosion of which makes the bull furious. The *matador* now enters alone to complete the tragic business. As soon as the bull's eye catches the *muleta*, he generally rushes blindly at it; and then the *matador*, if he is well skilled, dexterously plunges the sword "between the left shoulder and the blade," and the animal drops dead at his feet. The victorious *matador* is greeted with acclamations, and not less so the bull, should he wound or even kill the *matador*, in which case, another *matador* steps forth into the arena; but human life is rarely sacrificed. Eight or ten bulls are often dispatched in a single day; twenty minutes being about the time usually taken to slay one.

In Madrid, in June, 1833, 99 bulls were killed in the course of a single week. During the exposition in Paris in 1889, a series of bullfights was given there, but after the first exhibition, the authorities forbade the actual killing or wounding of the bull; nevertheless a number of the *matadores* were seriously injured. See *illus.*, SPAIN, vol. XIII.

**BULL-FINCH**, *Pyrrhula vulgaris*, a bird of the great family of *fringillidae* (q.v.), a little larger than the common linnet, and of a genus closely allied to the crossbeaks and crossbills. The genus is particularly characterized by the short, thick, rounded bill, of which the sides are inflated and bulging, and the tip of the upper mandible overhangs that of the lower one. The bull-finch is a bird of very soft and dense plumage, of a delicate bluish-gray color above, the under parts of a bright tile-red, the crown of the head and the beak jet black, which color also appears in the greater wing and tail coverts, in the quills, and in the tail-feathers; the wings are crossed by a conspicuous white bar. The colors of the female are less bright than those of the male. The tail of the bull-finch is almost even. This bird is not unfrequent in England, Ireland, and the s. of Scotland; and is found in most parts of Europe, from the s. of Norway to the Mediterranean, extending eastward throughout Asia, even to Japan. It frequents woods and gardens, builds its nest in trees or bushes a few feet from the ground, feeds chiefly on seeds and berries in winter, and in spring is excessively destructive to the buds of fruit-trees in those localities in which it is abundant, selecting the flower-buds.

The song of this bird, in a wild state, is very simple, and has no particular quality to recommend it; but it is remarkably susceptible of improvement by education; and trained bull-finches of superior acquirements are sold at a very considerable price. Some of these birds learn to whistle an air very accurately, and with a power and variety of intonation far exceeding their natural song. The ability to whistle several airs well, is rare. The training of these birds is a work both of time and trouble: it is chiefly carried on in Germany. Not less than nine months of training are requisite: it begins when the bird is a mere nestling, and must be carefully continued till after the first moulting; for it is a curious circumstance, that all which has been previously acquired is very apt to be lost at that time, or is afterwards so imperfectly remembered that the bird is of little value. The bull-finch is capable of very strong attachment to those who feed and caress it, and often becomes so thoroughly domesticated as to exhibit no desire for

liberty.—Curious variations of plumage are sometimes observed in it.—Other species of the genus *pyrrhula* are known, natives of different parts of the world; and in this genus some ornithologists include *corythus* of Cuvier, of which one species, the pine-finch (q.v.), or pine grosbeak, is a native of Britain. See *illus.*, *BIRDS*, vol. II.

**BULL-FROG**, *Rana pipiens*, a species of frog (q.v.) found in most parts of the United States and Canada, but chiefly abundant in the southern states. It is of a large size, 8 to 12 in. long, of an olive-green color, clouded with black. It receives its name from the remarkable loudness of its voice, which has been compared to the bellowing of a distant bull, and comes in as a hollow bass in the frog concerts which take place in the evening and all night long in marshy places in America. Its voice can be distinctly heard at a distance of 40 or 50 yards. It sits for hours during the day, basking in the sun, near the margin of a stream, into which it plunges with a great leap on the least appearance of danger. It does not confine itself to insect and molluscan food, like smaller frogs, but is said to be partial to young ducks, and to swallow them entire. Audubon says "its flesh is tender, white, and affords excellent eating," the hind legs, however, being the only part used for food. He adds that these parts make excellent bait for the larger cat-fish.

**BULL**, GOLDEN, applied to the decree of Charles IV. of Germany, published in 1356, to fix the laws for the election of emperors and regulate the number of electors. A similar edict by Andrew II. of Hungary (1222), for similar purposes bears the name.

**BULLHEAD**, RIVER BULLHEAD, or MILLER'S THUMB, *Cottus gobio*, a small fish, abundant in clear rivers and streams, in some parts of the British islands, throughout the greater part of Europe, and in the n. of Asia. It seldom exceeds 4 or 5 in. in length; is of a dark brown color on the upper parts, and white beneath; has rather large fins, with rays slightly produced into spines and prettily spotted; and in general appearance is not unlike the gurnards (q.v.). It is, however, generally regarded as a disagreeable object to the sight, on account of the great size and depressed form of its head, from which it derives its English names; the name, miller's thumb, alluding to the broad rounded form which the last joint of the thumb of a miller used to acquire in times when machinery was ruder than now, by its continual employment in testing the quality of the flour produced, and in turning it over on the fingers for inspection, that it might be known if the mill was doing its work well. The appearance of the B. is rendered still more unattractive by the entire absence of scales, a characteristic of the genus to which it belongs, the whole body and head being covered with a soft skin. Yet it is said to be of a very delicate flavor, and in some countries is much sought after as an article of food. Its flesh, when boiled, is reddish, like that of the salmon. Izaak Walton speaks of angling for the B., and in his pleasant quaint style describes the habits of the fish: "He does usually dwell and hide himself in holes, or amongst stones in clear water, and in very hot days will lie a long time very still, and sun himself, and will be easy to be seen upon any flat stone, or any gravel, at which time he will suffer an angler to put a hook baited with a small worm very near into his mouth, and he never refuses to bite, nor indeed to be caught, with the worst of anglers."—The other British species of the genus *cottus* (q.v.) are marine. The name B. is not usually given to any of them. A sea-fish of a nearly allied genus (*aspidophorus*) is sometimes called the ARMED BULLHEAD; it is also known as the Pogge (q.v.).—The river B. differs from the marine species of the same genus, in having only one short spine on each side of the head, on the *preoperculum*.

Bullhead is, again, a popular name applied to several species of fresh and salt water fish found in the eastern parts of America, and belonging to the genera *cottus* and *acanthocottus*. The common B., often called the "sculpin," is well known to anglers for its scarecrow form and colors. They are voracious, devouring small fish, crabs, decayed flesh, etc., and frightening away such fish as they cannot eat. They vary greatly in size, but are usually small, and seldom used for food.

**BULLINGER**, HENRY, the friend of Zwingli, and one of the chief reformers in Switzerland, was born at Bremgarten, in the canton of Aargau, July 18, 1504. He studied at Cologne, where he became acquainted with the writings of Luther; and during the year 1527, he attended the theological expositions of Zwingli, and went along with the latter to the religious conference held at Bern in 1528, the result of which was the reformation of the canton. In 1529, he married Anna Adlischwyler, formerly a nun, who bore him eleven children. By a powerful sermon which he preached at Bremgarten, on Whitsunday, 1529, B. induced his whole congregation to make a profession of Protestantism. In 1531, he was compelled by the Catholic party to flee from the canton, and went to Zurich, where, in the following year, he was appointed pastor of the principal church. In the controversy on the eucharist and the affairs of the Anabaptists, B. distinguished himself by his integrity and moderation; and in his house at Zurich several German theologians, compelled to leave their country, were hospitably sheltered. He took part in drawing up the first Helvetic confession at Basel, in 1536, and in establishing a close relation between the Swiss and Anglican churches. He died Sept. 17, 1575. His writings are numerous. The most important is a *History of the*

*Reformation*, which was first published at Zurich, 1838. His sermons have been translated into English. See the Lives of B. by Hess (1828) and Christoffel (1875).

**BULLION** usually means uncoined gold and silver, in bars or other masses; but in discussions on the currency, the term is frequently employed to signify the precious metals coined and uncoined. The origin of the word B. in its present sense, as well as that of the French *billon* (q. v.), and the corresponding Spanish *velon*, seems to be as follows: B. originally meant the mint, where the alloy for the coinage was prepared, and the coin stamped (either from the Lat. *bullā*, a round boss or stud, or stamp; or from the verb *bullare*, to boil or bubble); and hence it came in England to signify the standard metal of which the coins are made. In France, where the kings debased the currency much more than ever took place in England, *billon*, the mint, came to signify the base mixture issued therefrom.

It is a question not yet satisfactorily settled, how far any great increase in the supply of B. has that effect in lessening the value of money, and consequently raising prices, which has always been very naturally attributed to it. It may indeed be maintained with some plausibility, that if B. were capable of being produced to such an extent beyond the actual demand for it as to glut the market, it would cease to be that general standard of money value which it has become, just because it is of all others the article which is steadiest in requiring a certain outlay of labor to produce it. Rises in prices have accompanied large supplies of gold, but they have also accompanied large supplies of other commodities indicative of a great increase in riches. It is certain that great increases in the supply of B. do not, as in the case of other goods, glut the market. Several years ago, the supply of gold, owing to the new fields opened in America and Australia, was about quadrupled, with certainly no more influence on prices than what a general increase in prosperity might cause. There is, it will be observed, this great difference between gold and other commodities, that besides what may be within the crust of the earth, there is a great mass which has been accumulating for thousands of years in the possession of mankind, which comes forth as it is wanted. A few millions of tons of iron, or bales of cotton, beyond the usual annual average, would perhaps add a hundred per cent to the available quantity for consumption; but a few millions of pounds' worth of gold, having to be counted with all the gold in existence in the world, makes a scarcely perceptible addition to the stock. Of late years the production of gold has been steadily declining, while that of silver has been increasing, a fact due to the opening of the great silver mines in our western states. The natural result of this has been the appreciation of gold in value as compared with silver, an appreciation which would have been greater had not the demand for silver received a steady impetus by the increased use of it in the arts. The value of the gold production of the world in 1895 was estimated by the director of the United States Mint as \$208,000,000. Of this the United States produced \$46,610,000, or 2,254,760 ounces. The total amount of gold deposited at the U. S. mints from 1793 to 1895 was \$1,587,410,923. Regarding silver, the United States produced in 1895 silver bullion to the amount of \$72,051,000. Since 1793 the total value of the silver coined here is \$687,607,628. Canada now produces annually about \$1,000,000 worth of gold and \$400,000 worth of silver. See **BIMETALLISM**; **MINING**; **GOLD**; **SILVER**.

**BULLITT**, a co. in central Kentucky, on Salt river and Rolling fork, intersected by the Louisville and Nashville railroad, 272 sq. m.; pop. '90, 8291, includ. colored. Productions, chiefly agricultural, timber, corn, and fruit. Co. seat, Shepherdsville.

**BULLOCH**, a co. in s.e. Georgia, between the Ogeechee and Cannouchee rivers; 908 sq. m.; pop. '90, 13,712, includ. colored. It is level, with poor soil, in large part covered with pine forests, and abounding in game. Corn, cotton, and sweet potatoes are raised. Co. seat, Statesboro.

**BULLOCK**, a co. in s.e. Alabama, on the Conecuh river, and the Central Georgia railroad; 640 sq. m.; pop. '90, 27,063, includ. colored. Productions, corn, cotton, etc. Co. seat, Union Springs.

**BULLOCK, ALEXANDER HAMILTON, LL.D.**, 1816-82; b. Royalston, Mass.; fitted for college at Leicester acad.; graduated at Amherst college, 1836; teacher at Princeton, N. J., 1836-39; studied law with Emory Washburn and at Harvard Law School, 1839-41; was admitted to the bar, 1841; practiced in Worcester, 1842-82. He was a member of the Mass. house of representatives, 1845-47 and 1861-65; speaker, 1862-66; member of Mass. senate, 1849; commissioner of insolvency, 1853-66; judge of court of insolv., 1856-58; mayor of Worcester, 1859; gov. of Mass. 1866-68; trustee of Amherst coll., 1852-82. He published a number of addresses political and literary. He received from Amherst, 1865, and from Harvard, 1866, the degree of LL.D.

**BULL RUN**, a small stream in n.e. Virginia, falling into the Occoquan about 25 m. s.w. of Washington, the site of two important battles early in the late civil war. The first battle took place July 21, 1861, the national forces commanded by Gen. McDowell and the confederates by Gens. Johnson and Beauregard. The forces were about 28,000 for McDowell and very nearly the same number on the other side, though not more than



18,000 unionists were actually in the conflict. Until about 4 P.M. the advantage was evidently with the union side; but at that time an impetuous charge from Beauregard's whole line turned the tide, and the union army was completely routed and fled as best they could across the stream to Centerville, where a council of war was held and a retreat to Washington determined upon. The union loss was: killed, 481; wounded, 1011; missing, 1460. The confederate loss was: killed, 378; wounded, 1489; missing, 30.

On the 29th and 30th of Aug., 1862, the second battle was fought, Gens. McDowell and Pope commanding the union forces, with Gens. Lee, Jackson, and Longstreet on the other side. On the last day the unionists were defeated and fell back to Centerville, where they suffered another repulse, and then retired to Washington. The forces engaged were about 35,000 union, and 46,000 confederate. No complete report of the union losses was given, but the figures for killed, wounded, captured, and missing are put at 11,000; Lee reported the confederate loss to be 1090 killed, and 6514 wounded, but the report was incomplete, others making the total loss 8400. The confederates call these engagements the "first and second battles of Manassas."

**BULLS AND BEARS**, a common designation in the stock market for two classes of operators; the "bulls" being those who seek to advance prices, and the "bears" those who endeavor to bring them down. A fanciful derivation of the term is that a bull tosses up with his horns, while a bear tears down with his claws.

**BULL'S EYE**, an oval wooden block without a sheave, but with a groove around it for the band and a hole in the centre, through which a small stay or rope may be rove. A perforated ball on the jaw-rope of a gaff. A round piece of thick glass, convex on one side, inserted in a deck, port, scuttle hatch, or skylight cover of a vessel to admit light. Also the central or innermost division of a target, usually round and of a different color from the rest.

**BULL-TERRIER**, a cross-breed of the regular bull-dog and various kinds of terriers, having more docility than the bull-dog and all the sagacity of the terrier. The bull-terrier is a favorite house-dog, noted for watchfulness and its intense enmity to rats.

**BULL TROUT**, *Salmo eriox* or *S. grisus*, a fish nearly allied to the salmon, and like it, migratory in its habits, ascending rivers, in which it deposits its spawn, but living chiefly in the sea. It occurs in many of the rivers of Britain, and is not unfrequently taken in the Tweed and its tributaries. It is frequently called the GRAY TROUT, sometimes simply the GRAY, and is the SEWEN of the Welsh rivers. It sometimes attains the weight of 20 lbs., although it is more commonly under 15 lbs. weight. It is less elegant in form than the salmon; the head and nape of the neck are thicker in proportion; and the tail, beyond the adipose fin, is more bulky and muscular; the tail fin is square at the end in young fish (in some places called *whittings*), and in older ones, becomes convex by the elongation of the central rays, whence the name *roundtail* sometimes given this species. The scales are rather smaller than those of a salmon of equal size, and the color is less bright; the males in the spawning season being reddish brown, the females blackish gray; at other times the general color is like that of the salmon trout. The B. T. agrees with the salmon in having only a few teeth on the most anterior part of the *vomer* (the bone which runs down the center of the palate); while the salmon trout, the common trout, and the great lake-trout, have a long line of teeth there: the teeth are larger and stronger than those of the salmon; there are differences also in the form of the gill-covers. To anglers the B. T. is next to the salmon as a prize, and by many is mistaken for it. The flesh is paler in color, coarser, with much less flavor, and is much less esteemed.—The name B. T. has been also given to the HUCHO (*salmo huchio*),

**BÜLOW, FRIED. WILH. VON**, a famous Prussian gen. in the war of liberation, was b. in 1755, entered the army young, and soon distinguished himself. When Prussia declared war with France in 1813, it was B. that commanded in the first successful encounter with the French at Möckern, April 5, and revived the self-confidence of the army after the adverse battle of Lützen. His victories over Oudinot and Ney at Grossbeeren and Dennewitz, saved Berlin, and inflicted severe loss on the enemy. He acted a conspicuous part in the battle of Leipsic, and by taking possession of Montmartre, finished the campaign of 1814. The king acknowledged his services by an estate worth \$150,000, and the title of count Dennewitz. In the campaign of 1815, he joined Blücher by forced marches, and headed the column that first came to the aid of Wellington at Waterloo. He died at Königsberg, Feb. 25, 1816.

**BÜLOW, HANS GUIDO von**, pianist and composer, b. in Dresden, Jan. 8, 1830. He studied the pianoforte under Friedrich Wieck, and harmony and counterpoint under Eberwein and Hauptman, and entered the University of Leipsic in 1848, and that of Berlin in 1849 to study law. After hearing a performance of *Lohengrin* conducted by Liszt in Weimar in 1850, he resolved to make music his profession, much to the disappointment of his father, Edouard von Bülow, a littérateur of reputation, and placed himself under Wagner in Zurich, but subsequently went to Weimar to study the pianoforte with Liszt. In 1858 he made his first concert tour in Germany, with great success. In 1855-64 he was principal instructor of the pianoforte in the Conservatory of Berlin, where he organized symphony and chamber concerts, and contributed musical articles to the press to advance the theories of Liszt and Wagner, and also edited the

*Neue Zeitschrift für Musik.* In 1864 he became director of the conservatory and conductor of the Royal Opera in Munich, where he conducted the first performance of Wagner's (q. v.) *Tristan und Isolde* and *Die Meistersinger*. He lived several years in Florence, went to London, and in 1875-76 visited the United States. Afterwards he was conductor of various orchestras in Germany, and again visited America in 1880 and 1890. In 1857 he married Liszt's daughter, Cosima, who was divorced from him in 1869 to marry Wagner. Bülow ranks with Liszt, Rubinstein, and D'Albert as one of the greatest pianists of his century, and his fame as a conductor is equally great. His memory was extraordinary, as he played and conducted everything without notes, and his repertory included all the important literature for the pianoforte and orchestra. He was probably the most erudite musician in the history of his art, and his scholarly attainments extended beyond his profession. Von Bülow was the greatest authority on Beethoven, and published a valuable edition of his pianoforte works. He also made pianoforte transcriptions from Wagner, Liszt, and Berlioz. His original compositions include: Music to Shakespeare's *Julius Cæsar*, op. 10; *Des Sängers Fluch*, ballade for orchestra on Uhland's poem, op. 16; and *Nirvana*, a symphonisches Stimmungsbild, for orchestra, op. 20. He d. in 1894.

**BULOZ**, FRANÇOIS, 1803-77; b. Vulbens, near Geneva, Switz.; settled in Paris and became first a proof-reader and then a translator. In 1831 he founded the *Revue des Deux Mondes*, a bi-monthly, which he edited with such conspicuous ability as to make it the representative literary journal of France. The *Revue* was afterward edited by his son Charles.

**BULRUSH**, an English popular name for large rush-like or reed-like plants growing in marshes, not very strictly limited to any particular kind. Some authors employ it in a restricted sense as the designation of plants of the genus *typha*, also known as cat's-tail or reed-mace. See **TYPHA**. It is perhaps more commonly restricted to large species of the genus *scirpus* (q. v.), also called club-rush, and particularly to *S. lacustris*, a common British plant, found also in all the northern parts of the world, growing about the muddy margins of lakes and ponds, with a creeping root and round stems varying from 2 to 8 ft. in height, which are almost leafless, and bear their flowers in compound umbels of small brown spikelets on their side. The root is astringent and diuretic, and was formerly employed in medicine; but the stems are the most useful part of the plant, being much employed for making chair-bottoms, mats, etc.; also by coopers for filling up spaces between the seams of casks, to which purpose their spongy nature particularly adapts them, and not unfrequently for thatching cottages.

**BULSAR**, a seaport of India, in the British district of Surat, presidency of Bombay, on the estuary of a small river of the same name, which falls into the gulf of Cambay. It is 44 m. s. of Surat. It is a thriving place, with manufactures of gingham, and a considerable trade in grain, salt, and sugar. Pop. about 13,200.

**BULTI**, or **LITTLE THIBET**, a territory lying on the upper Indus beyond the Himalaya, and forming a sort of debatable land between India and Tartary. It is immediately to the n. of the valley of Cashmere, with which it is politically connected by conquest. It occupies about 12,000 sq. m., extending in n. lat. between 35° and 35° 30', and in e. long. between 75° and 76°. With an average elevation of about 7000 ft. above the sea, B. is surrounded by mountains of nearly the same height above its own level. Hence the temperature is such that only snow falls in what ought to be the rainy season, though in summer the thermometer ranges at noon from 70° to 90° F. European fruits are said to be plentiful. The inhabitants are of the Mongolian race, and chiefly Mohammedans. Among the animals are the sha, the large-horned goat, the sheep, the musk-deer, and the ibis. The only town of consequence is the capital, Iskardoh, which, in fact, sometimes gives its name to the whole province.

**BULBEGURH**, or **BALLAMGARH**, a t. of India, the principal place of a jaghire of the same name, called also Furreedabad. The town is situated on the route from Delhi to Muttra, 29 m. s. of Delhi, in a pleasant well-cultivated country. The town is not large, and is very crowded, surrounded by a high brick wall, with mud bastions and a deep ditch.

**BULWARK**, in military matters, was the old name for a rampart or bastion. In a ship, the bulwarks are the boarding above the level of the upper deck, nailed to the outside of the timber-heads and stanchions. In ordinary vessels they form a parapet, protecting the seamen from the waves, and prevent loose articles from being swept off the deck; in men-of-war they, in addition, serve to protect the men from an enemy's shot.

**BULWER**, Sir HENRY LYTON, G.C.B., the right hon., diplomatist and author, an elder brother of the late lord Lyton, was b. Feb. 13, 1801, entered the diplomatic service in 1827, and was attached successively to the British embassy at Berlin, Brussels, and the Hague. In 1830, he entered parliament, and during the following seven years he represented, in order, the constituencies of Wilton, Coventry, and Marylebone. In 1837, he became secretary of embassy at Constantinople, where he negotiated and concluded a treaty which is the foundation of our present commercial system in the east. In 1843, he was made minister plenipotentiary to the court of Madrid, and concluded the peace between Spain and Morocco in the following year. Whilst in Spain, his firmness and candor proved a source of great inconvenience to Narvaez, the Spanish soldier-diplo-

matist of that day, and who, pretending to have discovered the complicity of the British plenipotentiary in certain plots against the Spanish government, ordered him to leave Madrid. Both parties in the house of commons approved of the whole course of B.'s conduct while at the court of Madrid, and her majesty awarded to him the highest decorations of the order of the Bath. In 1849-52 he was minister at Washington, where he negotiated the Bulwer-Clayton treaty in 1850 (see CLAYTON, JOHN MIDDLETON), and maintained the interests of his own country. In 1852, he was sent to Tuscany as envoy extraordinary; and in 1856 was nominated by lord Palmerston commissioner at Bucharest for investigating the state of the Danubian principalities. As British commissioner, he called forth from every minister and from every government concerned the warmest expressions of approval, and all concurred in recommending him for the post of ambassador to the Ottoman porte, on the return of lord Stratford de Redcliffe, in the spring of 1858. Sir Henry Lytton became a peer in 1871, with the title of lord Dalling and Bulwer. He died in 1872. His works include a *Life of Palmerston*; *Historical Characters*; *An Autumn in Greece*; *France, Social, Literary, and Political*; and a *Life of Byron*.

**BULWER-LYTTON, EDWARD ROBERT**, Earl, only son of the English novelist, b. 1831; educated at Harrow and Bonn; went into diplomatic service, 1849, under his uncle, sir Henry, who was then British envoy to the United States; afterwards served diplomatically at Florence, Paris, the Hague, Vienna, Copenhagen, Athens, Lisbon, Madrid, and again at Vienna and Paris. He succeeded to his title on the death of his father in 1873. In 1874 he was sent again to Lisbon as ambassador, and 1876-80 was viceroy of India, where, Jan. 1, 1877, he presided at the ceremonial proclamation of Victoria as empress of India. In literature he was widely known as "Owen Meredith," and as the author of many poems, the chief of which is *Lucile*. Other works are *Tannhäuser, or the Battle of the Bards*; *Neville Temple*; *Julian Fane*; songs of Serbia; *The Ring of Amaris*; *Chronicles and Characters*; *Ordeal, or the Fool of Time*; imitations in verse from various languages; *Fables in Song*; a biography of his father, 1884; and *King Poppy* (posthumous, 1892). From 1867 till his death in 1891, he was British ambassador at Paris.

**BULWER-LYTTON, Sir EDWARD.** See LYTTON.

**BUM BAILIFF.** See BOUND BAILIFF.

**BUMBOAT**, a boat employed to carry provisions and other articles from harbors and ports to vessels lying at some distance from the shore. Boats of this kind belong to a class of petty traders, who in England are, for the most part, women. The provisions commonly offered for sale are soft bread, butter, fruit, vegetables, fish, and fresh meat—the fish fried, and the meat roasted, if wanted. Among the other articles are included shirts, drawers, stockings, gloves, pipes, needles, thread, and a variety of odds and ends. The less respectable of the B. traders try to smuggle spirits on board; but if this is discovered, it leads to instant punishment. In fitting out and also in paying off ships in the navy, the B. people are allowed on board for a certain length of time daily; but when a ship is in active commission, they come alongside only at meal-hours. Among the class of B. people generally, there is no little acuteness and enterprise.

**BUNKIN**, or **BOOMKIN** (diminutive of *boom*), on shipboard, is a short boom which projects over each bow of the ship, to aid in extending the lower edge or clue of the foresail to windward—in nautical phrase, "to board the fore tack to." In a boat, the B. is a small outrigger over the stern, used for extending the mizzen.

**BUMMALOTI**, *Saurus ophiodon*, a fish of the family *scopelids* or *saurids*, often regarded as a subdivision of the great family *salmonids*. It is a marine fish, a native of the coasts of India, particularly of the Bombay and Malabar coasts, from which it is exported in large quantities, salted and dried, to other parts of India, being highly esteemed for its rich flavor, and often used as a relish. In commerce, it is known not only by the name B., but by the singular appellation of *Bombay duck*. It is a fish of elongated form, with large fins and a very large mouth, the gape of which extends far behind the eyes, and which is furnished with a great number of long, slender teeth, barbed at the points. It is extremely voracious.

**BUNCE, FRANCIS MARION**, naval officer; b. in Hartford, Conn., Dec. 25, 1836; became a midshipman in the U. S. navy 1852, commander 1871, captain 1883, and commodore 1895; was appointed commander of the North Atlantic squadron with the rank of rear-admiral in 1896; and had charge of the naval demonstration at the dedication of Gen. Grant's tomb, April 27, 1897.

**BUNCO**. A term borrowed from the *argot* of the police, to describe a method of swindling much practiced in large cities. The sharper learns the name and residence of a wealthy stranger, accosts him in the street, pretends to be a relative of some prominent citizen of the stranger's town, and after securing his confidence, manages to rob him in any one of several customary ways, either by inducing him to cash a check, to bet, to loan money, or, rarely, by actual violence.

**BUNCOMBE**, a co. in s.w. North Carolina, n.e. of the Blue Ridge, on French Broad river and the Southern railroad; 628 sq. m.; pop. '70, 15,412—2903 colored; in '90, 35,266. The surface is rough, but the soil is fertile and good for cattle-raising. There are warm springs in the n.w. part. Corn, wool, and tobacco are the chief productions. Co. seat, Asheville.

**BUNDELCUND'**, a territory of Hindustan, between Gwalior on the w. and the Jumna, which separates it from the Doab, on the n.e. The area formerly known as B. included four districts belonging to the British north-western provinces (Banda, Jalun, Jhansi, and Hamirpur). Now B. is officially used only for the "Bandalkhand agency," a sub-division of the Central India agency, and in this sense is applied to a group of nine native states, and twenty-five petty jaghires under native princes. The area of the agency is 10,214 square miles. Studded, as B. is, with isolated rocks, rising precipitously from its surface—each of them a nucleus, as it were, of independence—it has generally been very much subdivided. Notwithstanding that it is well watered, the climate renders irrigation indispensable; and it is accordingly interspersed, at the cost of great labor and ingenuity, with artificial dams. B., though not destitute of woodlands, presents rather jungle and copse than heavy timber. It is said to possess inexhaustible deposits of iron-ore and some coal. The principal towns of B. are Calpee, Jhansi, Callinger, Banda, Jalun, and Chaturpur. The first three are noticed in their places, Callinger being famous for its cave-temples, and Jhansi and Calpee having acquired celebrity in the mutiny of 1857-58.

**BUNDI**, or **BOONDER**, a t. of India, in n. lat.  $25^{\circ} 26'$ , e. long.  $75^{\circ} 43'$ , 190 m. s.w. from Agra, the capital of a small state of the same name. It is situated in a valley nearly surrounded by rocky hills.—The raj or state of Bundi has an area of 2225 sq. miles. A range of mountains running n.e. and s.w., divides two nearly equal level tracts—that on the s.e. extending to the river Chumbul, and that on the n.w. to the base of the mountains towards Ajmere. The climate is said to be unhealthy. Although the rajah and dominant portion of the inhabitants are Rajpoots, the greater part of the population, particularly in the mountains, are Meenas, supposed to be an aboriginal race, who are indefatigable freebooters. Pop. of B. in 1891, 296,000.

**BUNGALOW**, a species of rural villa or house, so called in India. Bungalows which form the residence of Europeans are of all sizes and styles, according to the taste and wealth of the owner. Some are of two stories, but more usually they consist of only a ground floor, and are invariably surrounded with a veranda, the roof of which affords a shelter from the sun. In the chief cities of Calcutta, Madras, and Bombay some of the bungalows are really palatial residences, while in the mofussil they are of more moderate pretensions. In general, they are provided with exterior offices, to accommodate the large retinue of domestics common in Indian life. Besides these private bungalows, there are military bungalows on a large scale for accommodating soldiers in cantonments; likewise public bungalows, maintained by government for the accommodation of travelers, and in which seem to be blended the characters of an English road-side inn and an eastern caravanserai. These bungalows, though they vary greatly in actual comfort, are all on the same plan. They are quadrangular in shape, one story high, with high-peaked roofs, thatched or tiled, projecting so as to form porticoes and verandas. The B. is divided into "suits" of two, three, or four rooms, provided with beds, tables, and chairs; windows of glass, and framed glass doors. Off each room is a bath-room, and earthen jars of cool water. Travelers are expected to carry their servants, cooking-apparatus, wine, beer, bedding, etc., with them; but the khitmutgar of the better class of bungalows supplies table-ware, condiments, and even sometimes food and liquors, and he is usually skilled in cooking. Government charges one rupee, or two shillings a day, to each traveler for the use of the bungalow. A book is kept, in which travelers enter their names, the time of their arrival and departure, with the amount paid, and any remarks regarding the state of the B. and its attendance he may think proper. Natives seldom stop in these public bungalows, for though legally open to all, they are almost exclusively resorted to by Europeans; and natives even of good condition are fain to seek "the squalid desolation of a tottering caravanserai," or village "dhurrumsala." At every travelers' B. is stationed a government peon, who acts as watchman, and is bound to assist travelers' servants in procuring supplies of fuel and food in the nearest village. The distance between each B. on a trunk-road is generally about 12 or 15 m.—an Indian day's journey. The introduction of railways will very soon put an end to the present system of traveling in India—a fact greatly to be desired, as the annoyance experienced moving slowly on with baggage and servants at the rate of a stage a day is almost inconceivable.

**BUNGAY**, a market-t. of the co. of Suffolk, England, 80 m. n.n.e. from Ipswich. It occupies the sides and summit of a gently rising hill, on the right bank of the Waveney, and is a well-built town, with wide streets, the principal ones diverging from the market-place. The town grew around Bungay castle, which is supposed to have been erected by the Bigods, earls of Norfolk, and of the walls of which some ruins still remain. The ruins of a Benedictine nunnery are also to be seen in the town. The church of the Holy Trinity is an edifice with a round tower, supposed to be of the time of Edward the confessor. There are numerous places of worship, belonging to different denominations, and schools, charitable institutions, assembly-rooms, etc. What was formerly the theater is now used as a corn-hall. B. carries on a considerable trade by the river Waveney in corn, malt, flour, coals, and lime. Pop. '61, 8805; '91, about 4000.

**BUNIAS**, a genus of plants of the natural order *crucifera*, distinguished by *incumbent* linear spirally twisted cotyledons (q.v.), and a nut-like silicule (or round pod) with 2 to 4 cells. Only a few species are known, natives of the Levant. One of these, *B. orientalis*, is cultivated in some countries—particularly in France—as a field-crop, for the sake of its leaves, which are used for feeding cattle. It was introduced into Britain more than 100 years since, but its cultivation has never become general, the amount of herbage which it yields being comparatively small. It is sometimes called **HILL MUSTARD**.

**BUNION** is a term applied in surgery to enlarged bursæ, or synovial sacs, situated in the anterior part of the foot, and especially over the metatarsal joint of the first or the fifth toe (see **FOOT**), and accompanied by more or less distortion of the joint. In the great majority of cases, bunions are directly produced by the pressure of badly-fitting boots; and if the boots are constructed of patent leather, or any material which stops the excreting action of the skin, this, too, may be regarded as an indirect cause of their formation. A bunion begins as a painful and tender spot over one of the metatarsophalangeal joints; the part gradually enlarges, and there are indications of an effusion into a natural bursa or a newly-formed sac. The progress of the affection may stop here, the bursa remaining, and serving to protect the subjacent parts from pressure; but far more frequently it undergoes repeated attacks of inflammation, causing its enlargement; or becomes the seat of corns; or suppuration of the contents of the cyst ensues. The last accident may be followed either by obliteration of the cyst, and cure, or by a troublesome form of ulcer, especially in persons of languid circulation.

It is only in its early stage that there is any hope of removing the disease; subsequently, the treatment must be only palliative. The tender spot that precedes the enlargement should be covered by night with wet lint and oiled silk, while by day a boot or shoe exerting no pressure on the part should be worn. If the part is very tender, it may be covered during the day with soap-plaster spread on wash-leather. As soon as a cyst can be detected, the part should be occasionally treated with strong tincture of iodine, with a view of promoting absorption. The writer of the article on this subject in Holmes's *System of Surgery*, recommends an ointment of biniodide of mercury (ten grains to an ounce of lard) for the cure of bunions when uninfamed, and for such as have much fluid within them. It should not be applied so constantly as to blister the skin. When, from any cause, inflammation takes place in the sac, water-dressing, or a poultice, should be applied; and as soon as there are definite signs of suppuration, a free incision should be made, which at once relieves the pain, and is often followed by a complete cure.

The ulcers resulting from the bursting of a bunion are very difficult to heal, especially in old persons whose circulation is languid. Stimulating local applications, such as ointment of resin, should be applied, while opium and stimulants should be prescribed for internal use, together with nourishing diet. Such ulcers, under the best treatment, not very unfrequently form the starting-point for senile gangrene.

**BUNKER HILL.** See **CHARLESTOWN**.

**BUNKUM**, a phrase used in the United States to signify an oratorical display in favor of a sham proposal, in order to catch popular applause. A member of the legislature, for example, desirous of standing well with his constituents, makes a flaming speech in favor of a measure in which they are interested; but with the knowledge that the measure is impracticable, and will not be carried. In fact, the speaker does not want to carry it; his sole object is to impose on his supporters, and acquire the character of a meritorious public leader. Such is speaking for bunkum. In some instances, the state legislatures enact laws brought forward on these dishonest grounds—the whole members, or at least a large majority of them, having no other object than bunkum. The consequence is, that many laws, agitated for by popular factions, remain a dead-letter, unless they happen to be enforced by clubs organized for the purpose. The word **B.** is said to be a corruption of Buncombe, the name of a county in North Carolina, the representative of which informed congress on one occasion that he was merely speaking "for Buncombe."

**BUNNER**, HENRY CUYLER, 1855-96; b. Oswego, N. Y.; editor and author; editor of the humorous weekly, *Puck*, since 1877. His style was light and graceful, and he was particularly happy in the production of short stories and *vers de société*. He published *Airs from Arcady and Elsewhere*; the novels *The Woman of Honor*; *The Midge* (1886); *The Story of a New York House* (1887); *Short Sizes*, 1890; *Made in France* (1893); *More Short Sizes* (1894); and *Jersey Street and Jersey Lane and Love in Old Clothes* (1890).

**BUNO'DES GEMMA'CEA**, a species of the order actinoida. See **ANEMONE**, SEA.

**BUNSEN**, CHRISTIAN KARL JOSIAS, Baron, one of the most distinguished statesmen and scholars of Germany, was b. 25th Aug., 1791, at Korbach, in the principality of Waldeck, and studied philology at Göttingen (1809-13) under Heyne. He taught in the Latin school there and was private tutor to W. C. Astor of New York, with whom he traveled in Germany in 1813. To continue a course of study in old and middle high German and extend his knowledge of Teutonic tongues, Bunsen now went to Holland,

and afterwards to Copenhagen, where he learned Icelandic from Finn Magnussen. The historical works of Niebuhr and his character as a politician had filled B. with enthusiasm, and he spent some months of 1815 in Berlin, in order to become personally acquainted with the historian. In 1816, he went to Paris, and studied Persian and Arabic under Sylvestre de Sacy, and in the same year to Rome, where he married. Niebuhr, then Prussian ambassador, took the greatest interest in the scientific pursuits of B., and procured (1818) his appointment as secretary to the embassy. The residence of the king of Prussia, Friedrich Wilhelm III., in Rome in 1822, had a decided influence on his subsequent career. In the course of a conversation in which B. had disagreed with the king, the latter asked his views on the Prussian ritual (*Agende*) and hymn-book question, then much agitated. Though these views were very different from what the king had been accustomed to hear, he took them in good part, and with expression of his personal regard, requested B. to continue in the state service. On Niebuhr's departure from Rome (1824), B. conducted the embassy provisionally for a time, and was then appointed resident minister (1827). Living in intimate intercourse with Niebuhr, B. had employed the time in deepening his investigation into the philosophy of language and religion; and had made, on the one hand, the philosophy of Plato and the constitutions of antiquity; on the other, biblical inquiries, church history, and liturgies—objects of special attention. Though not within the scope of the great plan of his life, he contributed largely to the *Beschreibung der Stadt Rom* (Description of Rome), 3 vols. (Stutt. 1830-43); the greater part of the topographical communications on ancient Rome, and all the investigations into the early history of Christian Rome, are by him.—The first visit of Champollion to Rome formed an epoch in B.'s antiquarian studies. He was a zealous hearer of Champollion himself, and also encouraged Lepsius (q.v.) to the study of hieroglyphics. The archaeological institute, established in 1829, found in B. its most active supporter. When he founded the Protestant hospital on the Tarpeian rock (1835), he also built, adjoining his own house, a place of meeting for the institute; and labored earnestly for the cause of Protestantism. The king of Prussia had often asked his advice in the matter of the ritual, but had not adopted it. B. then, along with the chaplain, introduced (1825) into the chapel of the embassy at Rome a liturgy modeled after his own views, and sent a report (1828) to the king of the result. The king had this liturgy printed, and wrote the preface with his own hand. This work never came into the hands of the trade; but the most part of it was embodied in the *Allgemeine evang. Gesang- und Gebetbuch*, printed (1846) without the author's name, in the Rauhe Haus, Hamburg, which may be considered as the second edition of the *Versuch eines allgemeinen evang. Gesang- und Gebetbuchs* (Attempt at a General Evangelical Hymn and Prayer Book), Hamb. 1833.

In 1841, he was sent on a special mission to London, to negotiate the erection of an Anglo-Prussian bishopric in Jerusalem, and was shortly afterwards appointed ambassador at the English court. It is understood that, on occasion of a visit to Berlin in 1844, he was asked to write down his views on the question of granting a constitution to Prussia; and that in consequence he presented a series of memorials representing the urgency for a deliberative assembly, and also made a complete plan of a constitution closely resembling the English. In the Schleswig-Holstein question, B. strongly advocated the German view, in opposition to Denmark, and protested against the London protocol of 1850. But in the midst of all his political duties, B. continued unabated his literary and philosophical pursuits, the results of which have from time to time appeared. His views regarding the part that Prussia should act in the eastern question not being, it is understood, in accordance with those of his court, he ceased, in 1854, to represent Prussia at the court of England, and retired to Heidelberg. In the estimation of Englishmen, B. must ever hold a high place. No foreigner has ever shown a deeper appreciation of their national characteristics, or a heartier love of their social and political liberty. It must also be acknowledged that he has done service to the cause of enlightened Christianity, for while in England, he was regarded by those who knew him both as the most philosophical and most reverent of lay theologians. His chief works are: *De Jure Atheniensium Hæreditario* (Gött. 1813); *Die Kirche der Zukunft* (the Church of the Future—translated into English, and published by Longman), Hamb. 1845; *Ignatius von Antiochien und Seine Zeit* (Ignatius of Antioch and his Time), Hamb. 1847, *Die drei echten und die vier unechten Briefe des Ignatius von Antiochien* (The Three Genuine and the Four Spurious Epistles of Ignatius of Antioch), Hamb. 1847; *Ägyptens Stelle in der Weltgeschichte* (Egypt's Place in the World's History—translated into English by Cottrell), Hamb. 1845-57; *Die Basiliken des Christlichen Roms* (The Basilicas of Christian Rome), 1843; *Hippolytus und seine Zeit* (Hippolytus and his Time), 1851; *Christianity and Mankind*, 1854; *Gott in der Geschichte* (God in History), 1857; and the *Bibelwerk*, which B. hoped to make his chief work, of which only a part appeared before his death, which took place in 1860. See *Memoir* by his widow (1868).

**BUNSEN**, FRANCES, Baroness, 1791-1876; wife of Christian Karl Josias, of whom she published a biography, London, 1868, under the title *A Memoir of Baron Bunsen, Drawn Chiefly from Family Papers by his Widow, Frances, Baroness Bunsen*. She was an Englishwoman by birth and was distinguished for her unaffected piety and kindness of heart. See *Life and Letters*, by J. A. C. Hare.

**BUNSEN**, ROBERT WILHELM, a distinguished German chemist, b. at Göttingen, where his father was a professor, on March 31, 1811. He entered the university of his native town in 1828, where he devoted himself to the study of the natural sciences, especially to zoology and chemistry. He afterwards prosecuted his favorite studies at Paris, Berlin, and Vienna. After having held the post of professor at Cassel, Marburg, and Breslau, successively, B. was, in 1852, appointed to the chair of chemistry at Heidelberg, where he has since remained. He has published numerous papers on physics and geology, as well as on chemistry. The burner, pump, and battery which bear his name are in extensive use. That the hydrate of oxide of iron is an antidote to arsenic, is an important fact which was made known by him, along with his friend Berthold, in 1837. B. was the first to produce magnesium in large quantities; and in 1860 he invented the magnesium light, which has proved so important to photography. But the greatest discovery with which his name is associated, is that of the spectrum analysis—made in conjunction with his friend Kirchhoff—which has been the means of working so many wonders in chemistry, and revealing so much to astronomers. Its first result was the discovery of two new metals by him, *cæsium* and *rubidium*, and of *thallium* and *indium* by others. B. is not only a prolific discoverer in chemistry, but he has proved himself also one of its most successful teachers. His manner of demonstration is very happy. He published *Descriptio Hygrometrorum* (Göttingen, 1830); *Eisenoxydhydrat* (2d ed., 1837); *Gasometrische Methoden* (1857; English by Roscoe); *Flammen reactionen* (1880); and other papers. He was made a privy-councillor of Baden in 1863.

**BUNT**, a disease of wheat and other grains, or the parasitic fungus which causes that disease. The name B. is supposed to be a corruption of *burnt*, or at least derived from the same root, a derivation perhaps suggested by the analogy of *brand* (q.v.). B. is also called *pepper brand*, and sometimes *smut ball*. It is one of the most common and injurious diseases of wheat, often affecting great part of a crop, although its prevalence has been greatly diminished by care on the part of farmers, and particularly by the selection of clean seed, and the dressing of the seed, before sowing, with some substance, which, without injuring its vitality, destroys that of the spores or granules of the fungus. Even washing with water has a good effect, but greater benefit is derived from dressing with salt, quicklime, chloride of lime, Glauber's salt (sulphate of soda), and quicklime, or blue vitriol (sulphate of copper). Even arsenic and corrosive sublimate are used for this purpose. B. is now believed to be propagated by any contact of sound with unsound grain; by thrashing, which causes the B. dust to fly about; or by manure, in which the straw of infected grain has been mixed. Upon this knowledge, the means now adopted for its prevention are founded. A considerable mixture of B. is not supposed to render flour absolutely unwholesome, at least when made into fermented bread, but the bread is of a peculiar flavor, and a very dark color. It is said that such flour is used to no small extent in the manufacture of gingerbread.

**BUNTER SANDSTEIN**, or "variegated sandstone," is the lowest member of the triassic period. As the triass is more perfectly developed in Germany than in Britain, the German beds are considered the typical group of this period. The B. S. consists of various colored sandstones, interstratified with red marls and thin beds of limestone, which occasionally, as in the Harz, are oolitic, but in other places dolomitic. They attain a maximum thickness of 1500 feet. The English representatives of the B. S. are chiefly developed in Lancashire and Cheshire, and consist of red and mottled sandstones with beds of marl, and thick rather irregular bands of partially consolidated conglomerate called "pebble beds." Thirty species of fossil plants have been found in the B. S. near Strasburg, consisting chiefly of ferns, cycads, and conifers. But the most remarkable fossils in this formation are the remains of huge batrachians. Originally, the footprints which had been left by the animals on the moist sand were alone observed. From their resemblance to the impressions made by a human hand, the animal producing them was provisionally named *cheirotherium* (q.v.). The subsequent discovery and examination of the remains of teeth and bones in the same beds, have afforded sufficient materials to enable Owen to reconstruct an animal named by him *labyrinthodon* (q.v.), which undoubtedly produced the footprints. These remains have been detected in Lancashire and Cheshire, as well as in Germany.

**BUNTING**, or BUNTINE, is a thin woolen material, of which the flags and signals of ships are usually made.

**BUNTING**, *Emberiza*, a genus of birds closely allied to finches and sparrows, and included with them by some ornithologists in the great family *fringillidae* (q.v.), but by others made the type of a distinct family, *emberizidae*, of which the most marked characteristics are a short, straight, conical bill, a curved form of the gape, produced by a narrowing of the sides of the upper mandible, and a corresponding enlargement of the under one, and a hard rounded knob on the palate or inner surface of the upper mandible. This knob probably aids in crushing the seeds, which are a principal part of the food of these birds. The species of the B. family are numerous, and are arranged in several genera. The true buntings (forming the restricted genus *emberiza*) have the hind claw moderately short, curved, and strong, and the palatal knob large and bony. The COMMON B. or CORN B. (*E. mitaria*)—a bird considerably larger than a house-sparrow, brown, with darker streaks on the upper parts, whitish brown, with spots and lines of

dark brown on the under parts, and with a slightly forked tail—is frequent, particularly in low cultivated grounds in Britain, and in most parts of Europe, extending also into Asia, living in pairs during spring and summer, but in flocks in winter, and often visiting barn-yards at that season, along with chaffinches and sparrows. It is the largest of the British buntings. It is supposed that the winter flocks in Britain are much increased by migration from more northerly regions. This B. often passes the night on the ground in stubble-fields, and is taken in the nets employed for catching larks, and brought with them to market. It usually builds its nest on or very near the ground. Its notes are harsh and unmusical.—The REED B., or BLACK-HEADED B. (*E. phoeniceus*), is a species common in marshy situations, both in Britain and on the continent of Europe; a very pretty little bird, with black head and throat, strikingly contrasted with the white nape and sides of the neck.—The CIRC B. (*E. cinctus*), of which the head is olive-green, with black streaks, and with patches of bright lemon-yellow on the cheeks and over the eyes, is a rare British bird, and belongs chiefly to the s. of Europe and the n. of Africa. To this genus belong also the Orotolan (q.v.) and the Yellow-hammer (q.v.).—The SNOW B. (q.v.), or SNOWFLAKE (*E. nivalis* of many authors), has been placed in the new genus *pyrelophanes*. The name B. has been often very vaguely used, and many species have been almost indiscriminately called buntings or finches. The palatal knob affords the best distinctive character. North America has a number of species of bunting.—The BLACK-THROATED B. (*E. Americana*) is extremely plentiful on the prairies of Texas and other south-western parts of the United States; extending, however, as far as to Ohio, and even to Massachusetts. In the middle and northern states, it occurs only as a summer bird of passage. In its habits, it closely resembles the common B. of Europe; but the palatal knob is less hard.

**BUNTING, JABEZ**, an eminent Wesleyan minister, was b. at Manchester in 1779. At the age of 20, he devoted himself to ministerial work, in which he was very successful. He was elected president of the annual conference in 1820, and again in 1828, 1836, 1844. In 1834, he was chosen president of the theological institution belonging to the Wesleyan Methodist body, and he acted as one of the secretaries to the missionary society in connection with his denomination, for a period of more than twenty years. He was the chief authority in all matters relating to the government and polity of Wesleyan Methodism. On his retirement from official life in 1857, his friends presented him with an annuity of £200, in consideration of the great services he had rendered to Methodism. He did not live, however, to profit by their kindness and forethought, having died in June, 1858.

**BUNYAN, JOHN**, one of the most popular religious writers of any age, was b. at Elstow, near Bedford, in 1628. He was brought up to his father's trade of tinker, and spent his youth in the practice of that humble craft, of which his name alone now serves to lessen somewhat the disrepute. It has generally been taken for granted that his early life was very loose and profligate, on the sole ground of his terrible self-accusations in after-years, when, from the height of religious fervor and Puritan strictness, he looked back on dancing and bell-ringing as deadly sins. This point is satisfactorily disposed of by Macaulay (*Encycl. Britan.*, art. "Bunyan"). In his 16th or 17th year, he enlisted in the parliamentary army, and in 1645, was present at the siege of Leicester, where he escaped death by the substitution of a comrade in his place as sentry. Nothing further is known of his military career. After leaving the army, he married, and soon after began to be visited by those terrible compunctions of conscience, and fits of doubt, sometimes passing into despair, which, with some quieter intervals, made his life, for several years, a journey through that valley of humiliation of which he afterwards gave so vivid a picture. Hope and peace came at last, and in 1655, B. became a member of the Baptist congregation at Bedford. Soon after, he was chosen its pastor, and for five years ministered with extraordinary diligence and success, his preaching generally attracting great crowds. The act against conventicles, passed on the restoration, put a stop to his labors; he was convicted, and sentenced to perpetual banishment. In the mean time, he was committed to Bedford jail, where he spent the next 12 years of his life, supporting the wants of his wife and children by making tagged laces, and ministering to all posterity by writing the *Pilgrim's Progress*. His library consisted of a Bible and Fox's *Martyrs*. The kindly interposition of a high-church bishop, Dr. Barlow of Lincoln, at length released him, and he at once resumed his work as a preacher, itinerating throughout the country. After the issuing of James II.'s declaration for liberty of conscience, he again settled at Bedford, and ministered to the Baptist congregation in Mill lane till his death, at London, of fever, in 1688. B.'s whole works were published in 1786, in 2 vols. folio. The most popular of them, after the *Pilgrim's Progress*, are the *Holy War*—another allegory, much less successful—and *Grace Abounding to the Chief of Sinners*, an autobiographical narrative. It is supposed that no other book, except the Bible, has gone through so many editions, and attained to so wide a popularity, in all languages, as the *Pilgrim's Progress*. A fac-simile reprint of the original edition of the *Pilgrim's Progress* was published in 1875. A statue of B. was unveiled at Bedford in 1874. See *Life, Times and Works* by J. Brown (London, 1868).

**BUNZLAU**, a t. of Prussia, in the province of Silesia, is situated on the Bober, about 25 m. w.n.w. of Liegnitz. B. has manufactures of woollens, linens, hosiery, tobacco



and earthenware, and a trade in grain. An obelisk to the Russian gen., Kutusow, who died here in 1813, adorns the market-place. Pop. '90, 12,921.

**BUNZLAU**, JUNG or NEUE (*New Bunzlau*), a t. of Bohemia, on the left bank of the Iser, a tributary of the Elbe, 31 m. n.e. from Prague. It is well built of stone, has several churches, a Jewish synagogue, barracks, a hospital, a Piarist gymnasium, etc. It has manufactures of earthenware, glass, woollens, and hosiery. It is said to have been founded by king Boleslaf in 973, and the fort built by him still exists. Its Bohemian name is *Mlada Boleslav*. Pop. '90, 12,921.

**BUOL-SCHAUENSTEIN**, KARL FERD., Count, Austrian statesman, was b. 17th May, 1797. After filling subordinate diplomatic posts, he became ambassador at Carlsruhe in 1828, afterwards at Stuttgart (1833) and at Turin (1844). Leaving Turin on the outbreak of the war in 1848, he went as ambassador to St. Petersburg, and it fell to him to uphold the interest and dignity of his country, on occasion of the aid given by Russia in the Hungarian war. A not less difficult task was assigned him when, in 1851, he was sent to represent Austria in London; his address and conciliatory bearing contributed not a little to bring about a more friendly feeling between the two governments. On Schwarzenberg's death, B. was recalled to Vienna, and became foreign minister. In this position, he carried out the new politics of Austria no less firmly and successfully, though more moderately and quietly, than his predecessor. In the negotiations during and after the termination of the Crimean war, B. showed himself a skillful and able statesman. After defending with zeal and ingenuity, in diplomatic notes and circulars, the position which Austria had taken up with reference to Sardinia, B. suddenly, on the actual commencement of the Italian campaign of 1859, resigned his place, which was immediately filled by count Rechberg. Failing health was the cause officially assigned for the step, but the general belief was, that it indicated a triumph of the war-party in the council of Francis Joseph. He died Oct. 28, 1865.

**BUONAFEDE**, APPIANO, 1716-98; an Italian philosopher and general of the Celestines; author of several works on philosophical themes.

**BUONAROTTI**, MICHAEL ANGELO. See MICHAEL ANGELO.

**BUOY**, is a floating body intended as a mark for the limits of a channel, the position of shoals, rocks, wrecks, and the like. It is made either of wood or metal, and is mostly hollow to make it float the better. Buoys are generally moored by chains and heavy anchors or weights. It is the custom in northern latitudes, where more or less ice is expected in the winter season, to replace the metal buoys by wooden buoys until the ice has disappeared, as there is less danger of the wooden buoy being swept away or damaged. Buoys are of various kinds and shapes according to the purposes they are intended to serve; as can-buoys, made of sheet iron in the form of a frustum of a cone; spar-buoys, made of a spar which is anchored at one end; nun-buoys, used to mark the opposite side of the channel to the can-buoy, the name probably being derived from the similarity in shape to a nun's bonnet; bell-buoys, surmounted by a bell which is rung by the action of the waves; there is no clapper, but iron balls roll about on a plate under the bell's mouth, and striking against the inner surface of the bell, make a noise that can be heard at quite a distance; whistling-buoys are fitted with an apparatus by which air compressed by the movement of the waves is made to escape through a whistle, and so give warning of danger. In the waters of the United States the following system of placing buoys as aids to navigation is prescribed by law: Red buoys mark the starboard or right-hand side of a channel when coming from seaward, and black the port or left-hand side; mid-channel dangers and obstructions are marked with buoys having black and red transverse stripes, and mid-channel buoys marking the fairway have longitudinal black and white stripes; buoys marking sunken wrecks are painted green; buoys marking anchorage limits or dumping limits are painted white. The quarantine buoy, if there be one, is painted yellow. The starboard and port buoys are numbered from the seaward end of the channel in large white or black numbers, the black having the odd white numbers, and the red the even black numbers. The life-buoy now in common use in the navy consists of two hollow copper vessels, connected by a framework, and having between them an upright pole, weighted at the bottom and surmounted by a brass box containing a port-fire. This machine is hung over the stern of the vessel, and can be dropped by means of a trigger. At night the burning of the port-fire serves to point out its position. An anchor-buoy is a small metal buoy made fast to the anchor by means of a rope, and it is used to mark the position of the anchor, so that should the riding-chain part, the whereabouts of the anchor is still indicated by the buoy.

**BUOYANCY**, of ships, is the amount of weight which can be buoyed up by the hull. The B. of a vessel is proportionate to the weight of water displaced by its presence (see HYDROSTATICS), and is found in this way: The cubic feet of the part of a vessel to be immersed being known, multiply it by the weight of a cubic foot of water (62.5 lbs.), and the product will be the weight of water displaced. From this subtract the weight of the vessel, and the result will be the B. or the weight a vessel will carry without sinking lower than the given line. It is admitted, however, by naval architects, that all the old rules concerning B., displacement, and flotation, must undergo modification by the introduction of iron ships, paddle and screw propulsion, and the increased weight of broadside.

**BUPALUS AND ATHENIS**, Greek sculptors, 540 B.C., in the isle of Chios. They were brothers, and sons of Anthermus, also a sculptor. As they produced only draped figures, it is inferred that the art had not advanced so far as to attempt nude subjects. It is said that B. made a caricature of the poet Hipponax, who was naturally intensely ugly, and that the poet retorted by verses that drove the sculptor to suicide.

**BUPHAGA**. See BEEFEATER.

**BUPHONIA**, or **DIIPOLIA**, a religious festival held in Athens on the 14th July, when the very old ceremony of sacrificing an ox to Zeus was observed.

**BUPRESTIS**, a Linnæan genus of coleopterous (q. v.) insects, now divided into a number of genera, and forming a tribe or family, *buprestida*, of which some hundreds of species are known, most of them belonging to tropical countries, and remarkable for the splendor of their colors. The colors are generally metallic in their lustre, have frequently a burnished appearance, and are often beautifully iridescent. One of the largest species, *B. gigas*, is a native of Cayenne: it is about 2 in. long. The English and other European species are all comparatively small. Most of the species spend the night on trees, shrubs, and other plants, flying about during the hottest part of the day. Some of them are popularly known as **GOLDEN BEETLES**. Plants are sometimes seen studded with them in the morning, as with gorgeous flowers. The golden *elytra*, or wing-cases (see **COLLEOPTERA**), of some species are used in the embroideries of the Indian zenana; and the lustrous joints of the legs are strung on silken threads, and form necklaces and bracelets of singular brilliancy. The species of *buprestida* found in England are few; none have yet been found in Scotland. The larvæ seem sometimes to be transported from one country to another in timber. See *illus.*, **BEETLES**, ETC., vol. II.

**BUR**, in an engraving, is a slight ridge of metal raised on the edges of a line by the graver or the dry point. As the B. produces an effect like a smear, it is usually regarded as a defect, and scraped off. Some etchers, however, take advantage of it to deepen their shadows, and Rembrandt made use of it in this way with telling effect.

**BURANHEM**, or **BURUNHEM**. See **MONESIA BARK**.

**BURANO**, an island and t. of northern Italy, in the Adriatic, about 5 m. n.e. of Venice. The island supplies a large proportion of the vegetables consumed in Venice. B. has some lace-manufactures and boat-building, but the inhabitants are chiefly employed in fishing. Population of town, 5000; of commune, 7000.

**BURBAGE**, or **BURBADGE**, **RICHARD**, an eminent English actor, born about 1567, was the son of James Burbage, an actor, and the first to receive a royal license (1574). Richard made his début about 1588, and in 1599 converted Shoreditch theatre into the afterwards famous "Globe," having Shakespeare as one of his business associates. He acted there and at Blackfriars till his death abt. 1618; took leading parts in the best plays of the period, and was especially noted for his performance of Richard III. The Felton portrait of Shakespeare is attributed to him.

**BURBOT**, *Lota vulgaris*, a fish of the same genus with the ling (q. v.), and of the same family with the cod, haddock, etc., being the only British fresh-water species of that family, *gadida*. It is found in the Cam, the Trent, and other rivers of the eastern and midland counties of England, but is one of the most local of British fresh-water fishes. It is found also in various parts of the n. of Europe, and at least as far s. as Switzerland; in Siberia and other parts of Asia, even, it is said, in India. In English rivers, it often reaches 2 or 3 lbs. in weight, but has been taken of 8 lbs. weight; and in some parts of Europe, it is said to reach 10 or 12 lbs. weight. In appearance, the B. very much resembles the ling, but is rather thicker at the neck, and tapers rather more rapidly, although still of a somewhat elongated form. It has two dorsal fins, the first short, the second very long, and a very long anal fin.

**BURBRIDGE**, **STEPHEN GANO**, b. Ky., 1831; bred to the law, but engaged in mercantile business and farming. When the civil war opened, he entered the union service, and was distinguished for bravery in many engagements. He was brevetted major-general of volunteers in 1864, and resigned in 1865.

**BURCHARD**, **SAMUEL DICKINSON**, D.D., b. N. Y., 1812; was educated in Kentucky, where also was his first labor as a minister. During the yellow fever epidemic in the South he remained faithfully at his post while others fled. In 1839, he became pastor of the Houston street Pres. Church, New York; in 1870, he was made pastor of the Murray Hill Church; but, 1885, he withdrew from active service, and became pastor emeritus. Dr. B. became widely known during the Blaine-Cleveland campaign by his alliteration, "Rum, Romanism, and Rebellion," with which he charged the Democratic party at a Republican meeting in which he had unexpectedly been called to speak a few days before the election. The sentiment of this alliteration was attributed to Mr. Blaine on leaflets which his opponents immediately scattered by myriads among the Irish voters who had been favorable to him. At different periods he was chancellor of Ingham University and president of Rutgers Female Seminary. He died in 1891.

**BURCKHARDT**, **JOHN LEWIS**, an enterprising African traveler, was b. at Lausanne, in Switzerland, Nov. 24, 1784. In 1806 he went to London, and was introduced by sir Joseph Banks to the African association, which accepted his services to explore the

route of Hornemann into the interior of Africa, and he embarked for Malta, Feb. 14, 1809. He had previously qualified himself for the undertaking by a study of Arabic, and also by inuring himself to hunger, thirst, and exposure. From Malta he proceeded, under the disguise of an oriental dress and name, to Aleppo, where he studied about two years, at the end of which time he had become so proficient in the vulgar Arabic, that he could safely travel in the disguise of an oriental merchant. He visited Palmyra, Damascus, Lebanon, and other remarkable places, and then went to Cairo, his object being to proceed from thence to Fezzan, and then across the Sahara to Sudan. No opportunity offering itself at the time for that journey, he went into Nubia. No European traveler had before passed the Derr. In 1814, he traveled through the Nubian desert to the shore of the Red sea and to Jeddah, whence he proceeded to Mecca, to study Islamism at its source. After staying four months in Mecca, he departed on a pilgrimage to Mt. Arafat. So completely had he acquired the language and ideas of his fellow-pilgrims, that, when some doubt arose respecting his Mohammedan orthodoxy, he was thoroughly examined in the Koran, and was not only accepted as a true believer, but also highly commended as a great Moslem scholar. In 1815, he returned to Cairo, and in the following year ascended Mt. Sinai. The Fezzan caravan, for which he had waited so long, was at last about to depart, and B. had made all his preparations for accompanying it, when he was seized with dysentery at Cairo, which terminated his life in a few days, Oct. 15, 1817, at the early age of 33. As a holy *sheik*, he was interred with all funeral honors by the Turks in the Moslem burial-ground. His collection of oriental MSS., in 350 volumes, was left to the university of Cambridge. His journals of travel, remarkable alike for their interest and evident truthfulness, were published by the African Association. B. was a man born to be a traveler and discoverer; his inherent love of adventure was accompanied by an observant power of the highest order. His personal character recommended him to all with whom he came in contact, and his loss was greatly deplored, not only in England, but in Europe. His works are—*Travels in Nubia*, 1819; *Travels in Syria and the Holy Land*, 1822; *Travels in Arabia*, 1829; *Notes on the Bedouins and Wahabie*, 1830; and *Manners and Customs of the Modern Egyptians*, 1830.

**BURDACH**, KARL FRIEDRICH, 1776–1847; b. in Leipsic, physiologist. After graduating in medicine at Leipsic in 1800, he became in 1811, professor of physiology in the university of Dorpat. He spent the greater part of his life, however, in Königsberg, where he filled the corresponding chair in the university, and accomplished most of his scientific labor. Later he was transferred to the university of Breslau. His writings are profound and original.

**BURDEKIN**, a river in n.e. Australia, in the colony of Queensland, about 350 m. long, falling into Upstart Bay.

**BURDEN**, a term of law in Scotland, used to signify any restriction, limitation, or incumbrance affecting either person or property. Burdens are said to be either personal or real. Where a party is taken bound by acceptance of a right to pay a certain sum to another, but where there is no clause charging the subject conveyed with the sum, the burden is said to be *personal*; that is, it will be binding upon the receiver and his representatives, but will constitute no real incumbrance on the lands, or other subject conveyed, nor amount, indeed, to anything more than a mere personal obligation on the grantor. But where the right is expressly granted under the burden of a specific sum, which is declared a burden or charge on the lands themselves, or where the right is declared null if the sum be not paid, the burden is said to be *real*.

**BURDEN**, or **BURTHEN**, of a ship. See **TONNAGE**.

**BURDEN**, HENRY, 1791–1871; b. Scotland; son of a farmer; came to the United States in 1819, and the next year made the first cultivator used in agriculture in this country. His inventions include improvements in plows, a machine for making iron spikes, and one for fashioning horseshoes which produced 60 shoes per minute from the bar. He was agent and afterwards proprietor of the Troy iron and nail works, one of the largest manufactories in the world. He devoted much attention to steam navigation, and built, in 1833, a steamboat which from its shape was called the "cigar boat," but it was lost before its speed had been fairly tried.

**BURDEN OF PROOF**, in legal procedure, signifies the obligation to establish by evidence certain disputed facts; and, as a general rule, this burden lies on the party asserting the affirmative of the issue to be tried or question in dispute, according to the maxim *ei incumbit probatio qui dicit non qui negat*—that is, proof is incumbent on him who asserts, not on him who denies. The principle of the law is, that the B. of P. is on the party who would fail if no evidence were adduced on either side. Accordingly, it almost always rests on the plaintiff in an action, or on the party asserting the facts on which the result of the litigation must depend. In one case tried before the late baron Alderson, that learned judge laid down that the proper test was, *which party would be successful, if no evidence at all were given?* the B. of P., of course, falling on the party not in that position. This test has since been generally adopted and applied; but Mr. Best, in his learned work on the *Principles of Evidence*, improves on it by the suggestion, that in strict accuracy the

test ought to be, "which party would be successful, if no evidence at all, or no more evidence, as the case may be, were given?" a consideration on which the discretion and judgment of counsel frequently depend. But although such, in general, is the position of the plaintiff, it sometimes happens that the B. of P. is imposed on the defendant, and in consequence of his having the affirmative of the material issue to be tried.

In addition to what has been said it may be noticed that the obligation of the party upon whom the B. of P. rests is different in civil and criminal actions. In civil suits the obligation of the B. of P. is overcome if the proof is such that the probability of the assertion is proven; or more exactly, it will be sufficient if the preponderance of testimony, all things considered, is in support of the view sought to be established. In criminal cases, on the other hand, it is necessary for the jury, in order to convict, to find that the evidence establishes the guilt of the prisoner beyond a reasonable doubt.

**BURDER**, Rev. GEORGE, an active and influential minister of the Congregational body, was b. in London, June, 1752. After studying some time as an artist, he devoted himself to the ministry, and in 1778 was appointed pastor of an independent church at Lancaster. He afterwards removed to Coventry, and in 1808 to London. Here he became secretary to the London missionary society, and editor of the *Evangelical Magazine*, the duties of which offices he discharged with great zeal, until failing health compelled him to resign. B. took a prominent part in all the religious movements of his time. He died May, 1832. His *Village Sermons* have been translated into several European languages; and he was the author of other series of sermons and publications which have had an immense circulation.

**BURDETT**, Sir FRANCIS, Bart., the most popular English politician of his time, b. Jan. 25, 1770. Educated at Westminster school and Oxford university, he spent some years on the continent, and was a witness to the progress of the first French revolution. In 1798, he married Sophia, youngest daughter of Thomas Coutts, esq., the wealthy London banker, and in 1796 was elected M. P. for Boroughbridge, Yorkshire. In 1797, on the death of his grandfather, he succeeded to the baronetcy. In the house of commons, he made himself conspicuous by his opposition to government and the war, and his advocacy of parliamentary reform, Catholic emancipation, and other liberal measures, most of which were afterwards carried. One of the most effective political speakers of that excited period, he for many years prominently occupied public attention, and was the idol of the London populace. Having succeeded in obtaining a parliamentary inquiry into the abuses of the metropolitan prisons, he became, in 1802, a candidate for Middlesex. He was first returned, then unseated, and after a second contest, defeated. At the general election of 1806, B. again became a candidate for Middlesex, but was defeated. In May, 1807, he fought a duel with Mr. James Paull, one of the candidates for Westminster the previous year. Soon after, he was returned, with Lord Cochrane, for Westminster, which he represented for nearly 30 years. B. having in 1810 published, in Cobbett's *Political Register*, a letter to his constituents, declaring the conduct of the house of commons illegal in imprisoning John Gale Jones, the speaker's warrant was issued for his apprehension, as being guilty of a breach of privilege. Refusing to surrender, he for two days barricaded his house; the populace supported him in his resistance, and in a street contest between them and the military some lives were lost; but on April 9, the sergeant-at-arms, aided by the police and military, obtained an entrance, and conveyed him to the Tower. The prorogation of parliament restored him to liberty. Prosecuted in 1819 for a libel contained in a letter to his constituents, strongly animadverting on the proceedings of the magistrates and yeomanry at the memorable Manchester meeting, he was sentenced to three months' imprisonment in the King's Bench, and to pay a fine of £1000. In 1835, he deserted the liberal party, and joined the conservatives. In 1837, he was returned for Wiltshire. He died in 1844.

**BURDETT-COUTTS**, the Right Hon. ANGELA GEORGINA, baroness, daughter of Sir Francis Burdett, was b. in 1814. In 1837, she inherited much of the property of her grandfather, Thomas Coutts, the banker, on the death of his widow, who died duchess of St. Albans. The liberal and public-spirited use she has made of this wealth, in her efforts to mitigate the sufferings of her fellow-creatures and the lower animals, has rendered her name well known and deservedly popular. Besides spending large sums of money in building and endowing several churches and schools, she endowed the three colonial bishoprics of Cape Town, Adelaide, and British Columbia, at an outlay of about £50,000, and founded an establishment in South Australia for the improvement of the aborigines. In her zeal for the good of her own sex, she effected important reforms in the teaching of girls at the national schools, and established a shelter and reformatory for fallen women. To the city of London she has presented, besides several handsome fountains, the Columbia Market, Bethnal Green, for the supply of good and wholesome food in a poor district. She also built Columbia Square, consisting of model dwellings at low rents, for about 300 families; and, taking great interest in emigration, has assisted many poor families in their passage and outfit. Her private charities have been on a corresponding scale; and she is also a liberal patroness of art. In 1871, she accepted a peerage from government, with the above title. In 1872, the freedom of

the city of London was conferred upon her (the first woman who ever received it); and in 1874 the freedom of Edinburgh. She married W. L. Ashmead-Bartlett (b. in N. J.), in 1881.

**BURDETTE**, ROBERT JONES, b. Greensboro, Penn., 1844; educated at the High school, Peoria, Ill.; served as a private soldier during the war; in 1868 became night editor of the *Peoria Daily Transcript*. In 1873 he joined the staff of the Burlington, Iowa, *Hawkeye*, and soon made that paper famous by his humorous paragraphs. He became a popular lecturer, and published *The Rise and Fall of the Moustache, Hawkeyes, a* burlesque *Life of William Penn, Innach Garden*, etc.

**BURDICK**, a co. in north-western S. Dakota, formed in 1883; watered by the Little Missouri and Grand rivers.

**BURDOCK**, *Arctium*, a genus of plants of the great natural order *compositæ* (q.v.), tribe *cynarocephalæ*. The heads of flowers are globose, or nearly so; and each of the scales of the involucre runs out into a long rigid prickle, which is hooked at the point. By means of these hooks, the flower-head, popularly called a *bur*, readily lays hold of the clothes of a passer-by, the wool of a sheep, or the like, and thus the seeds are transported from one place to another, the short hairy pappus being insufficient to waft them far on the wind. The common B. (*A. lappa*), of which varieties very slightly distinguished have sometimes been described as species (*A. bardana*, etc.), is abundant in waste and bushy places, by waysides, etc., in Britain and throughout Europe, scarcely, however, growing except in rich land. Its root is biennial, large, and fleshy, somewhat carrot-shaped; the root-leaves large, stalked, heart-shaped; the stem stiff, upright, somewhat branched and leafy, 3 ft. or more high. The whole aspect of the plant is coarse, and it is somewhat clammy to the touch. The root is sometimes used in medicine, being diaphoretic and diuretic, and acting upon the cutaneous system and the kidneys. It is capable of being made a substitute for sarsaparilla. When fresh, it has a disagreeable smell, but when dry it is inodorous; it has a sweetish mucilaginous taste, becoming afterwards bitterish and rather acrid, and contains chiefly inulin, bitter extractive, mucilage sugar, and a little tannin. In many countries, the roots, young shoots, and young leaves of B. are used in soups; and the plant is cultivated for this use in Japan. The roots are said to resemble artichokes in taste. The leaves and their expressed juice are sometimes applied to burns and suppurations.

**BURDWAN**, a city in the district and province of the same name, in the government of Bengal, on the Grand Trunk road from the Hoogly to the n.w. provinces, in lat. 23° 12' n., and long. 87° 56' e., 74 m. from Calcutta, with which it is connected by railway. In point of architecture, it is a miserable place—an aggregate, as it were, of second-rate suburbs. Pop. 34,500.

**BURE**, or **BUR**, a mythical being who stands in Norse mythology as the grandfather of Odin, the supreme deity in that religion. The larger portion of Snorro Sturleson's work known as the *Younger or Prose Edda* (in distinction from the poetical or *Elder Edda*) is devoted to the *fooling of Gylfi*, and these two older and younger Eddas correspond in that old heathen religion very nearly to the old and new testaments in Christianity. It is not in place here to tell all the strange adventures of Gylfi in his search for the origin of things, but only so far as concerns Bure. Gylfi (who was a king of Svithiod, or Sweden) journeyed to Asgard (the home of the gods) in search of knowledge, and the gods, knowing of his coming and his purpose, were ready to answer him. After he had been satisfied about the gods, their number and attributes, Gylfi asked about their origin. He was told that, many ages before the earth was made, Niflheim (the nebulous or shadowy region) was formed; that in the middle of Niflheim was a spring called Hvergelmir (the roaring cauldron), from which twelve rivers flowed. When the rivers had flowed far from their sources the venom which they rolled along hardened, as does the dross that runs from a furnace, and became ice. The ice stood still, and the vapor that gathered over it froze into rime, or frosty-snow, and in this manner were formed in Ginnunga-Gap (the yawning abyss, or all space) many layers of congealed vapor, piled one upon another. But the southern part of Ginnunga-Gap was filled with sparks and flashes of fire that flew into it from Muspellheim (the home of elemental fire). In the conflict of elements the rime was melted and the melted drops took a human semblance, and the being thus formed was named Ymir (the primordial giant). Another creature formed from this conflict of heat and cold was a cow named Audhumla (darkness), and from her teats ran four streams of milk, on which Ymir was fed. "But," asked Gylfi, "on what did the cow feed?" The answer was that she supported herself by licking the surrounding stones, which were covered with hoar-frost and salt. The first day she licked there appeared the hair of a man; the second day the head came to view; and the third day the whole man appeared. This man was called Bur or Bure ("born," whence old German "barn," and Scottish "bairn," a child). This first creature in the form of a man was the father of Bør (also meaning born), who took for his wife Besla, the daughter of the giant Bolthorn (calamity or evil), and this pair were the parents of Odin, the Norse allfather, and his brothers Veli and Ve. No wife is named for Bure, nor is anything further related of him.

**BUREAU**, a French word signifying a writing table or desk; also, an office for transacting business, a department of government or the officials that carry it on. BUREAU.

**ACY** is popularly applied to signify the kind of government, exemplified in many continental states, where a host of government officials, regularly organized and subordinated, and responsible only to their chiefs, interfere with and control every detail of public and private life—the evil which the Germans call “much-government” (*viel-regieren*).

**BUREAU**, a co. in n.w. Illinois on the Illinois river; 870 sq.m.; pop. '90, 85,014; level and fertile, with little timber; the chief business is agriculture. It is intersected by the Chicago and Rock Island and other railroads. Co. seat, Princeton.

**BUREAU**, **ACHILLE**, 1835–88; foundryman; b. France; served an apprenticeship in Brussels; emigrated to Pennsylvania; entered the union army at the outbreak of the civil war, serving as private in the 18th volunteer regiment; in 1878 established a foundry in Philadelphia, in which were produced the first large pieces of bronze statuary cast in this country, among them the statues of Shakespeare in Central Park, N. Y., Gen. Thomas at Washington, and Gen. Reynolds at Philadelphia, and the Indian group at Chicago.

**BUREL**, or **BUREAU** (O. Fr. *burel*, russet color, from Lat. *burrus*, dark red), a cloth manufactured in England in the middle ages for cloaks and other outer garments; generally of coarse texture.

**BURETTE**, a tube used in assay offices, laboratories, and pharmacies, for dividing a liquid into small quantities, or for transferring minute portions of it. Gay-Lussac was the inventor, and the form approved by him consists of a large glass tube, graduated to  $\frac{1}{100}$  and  $\frac{1}{1000}$ , having a smaller tube parallel to the first and communicating with it at the lower end. (See illustration, *CHEMISTRY*, vol. III., fig. 8.) Mohr substituted a simple divided tube provided below with a caoutchouc tube closed by a spring clamp of brass wire. Where a great number of analyses of the same kind are performed, this form of B. is preferred, but inasmuch as some solutions act upon caoutchouc, Gay-Lussac's B. is better where a great diversity of analyses occur.

**BURG**, a t. of Prussia, in the province of Saxony, situated on the Ihle, about 13 m. n.e. of Magdeburg. It is walled, and has long been famous for its extensive woolen manufactures. It has also manufactures of linen, yarn, steel, pottery, and leather; dye-works, distilleries, foundries, etc., and a large trade in farm produce. Pop. '90, 17,572.

**BURGAGE TENURE** is a species of holding in the law of real property which prevailed both in England and Scotland, although somewhat differently regarded in these two countries. In England, it is a species of free *socage* (q.v.) holding, and it prevails where the king or other person is lord of an ancient borough in which the tenements are held by a certain and determinate rent, and subject to a variety of customs, the principal and most remarkable of which is that called *Borough English* (q.v.). Among the other customs was a law that the wife shall be endowed with all her husband's tenements, and not with the third part only, as at common law.

In Scotland, by this tenure is meant a peculiar sort of military holding affecting property in royal burghs, the sovereign being superior or over-lord, and each individual proprietor or burgess holding direct of the crown, for the *reddendo* or service of *watching and warding* (q.v.). This service is otherwise termed “service of burgh used and wont,” and is now merely nominal. Although the burgesses hold immediately of the crown, they do not receive their formal entry directly from the sovereign, but from the magistrates of the burgh, as the crown's commissioners. If the burgh, as such, ceases to exist, the crown does not thereby lose its rights over the proprietors, for they continue as crown vassals (q.v.). The statutes 81 and 82 Vict. c. 101, and 82 and 83 Vict. c. 116, abolished many useless forms in this tenure. See **TENURE OF LAND**.

**BURGAS**, or **BURGHAS**, a t. of Turkey, in the province of Eastern Roumelia, on a promontory in the Black sea, about 76 m. n.e. of Adrianople. B., which is well built and clean, has manufactures of pottery of a superior kind, and a good trade in agricultural produce. Pop. about 6500. The gulf of Burgas, at the head of which the town is situated, is about 14 m. in length, and has a depth varying from 5 to 13 fathoms.

**BURGDORF** (Fr. **BERTHOUD**), a t. in Switzerland, on the Emme, 14 m. from Bern. It is over 1800 ft. above sea level, and consists of a lower and an upper part, which are connected by spiral streets. There are an ancient castle, a town-house, hospital, library, etc.; also ribbon, tobacco, and chocolate manufactories, and a large trade in dairy products. In 1884 the town and countship were purchased by Berne for 37,000 florins, and the Bernese magistrates held rule until 1798. Pestalozzi had his school in the castle for a number of years. Pop. '88, 6875.

**BUR'GEO ISLANDS**, belonging to England, and lying between Newfoundland and cape Breton, in lat. 47° 33' n., and long. 57° 44' west. Besides being valuable as a fishing-station, they occupy a commanding position with respect to British North America in general, and the gulf of St. Lawrence in particular.

**BÜRGER**, **GOTTFRIED AUGUST**, one of the most popular German poets, was b. Dec. 31, 1747, at Molmerswende, near Halberstadt, in Prussian Saxony. In his boyhood, he displayed no capacity for hard study, and was particularly averse to Latin; but he at the same time showed a relish for verse, though destitute of any other model than the Psalm-book. In 1764, he went to Halle, and applied himself to theology. In 1768, he abandoned this science for jurisprudence, which he studied at Göttingen. Here his conduct

was careless and immoral, and he would probably have sunk into obscurity, if the intimacy which he happily formed with Voss, the two Stolbergs, and other young poets, had not stirred up his better nature, and inspired him with an earnest ambition to excel. He labored hard at the classics of ancient and modern times, but the study of Shakespeare and Percy's *Reliques* had the greatest influence in deciding the style of poetry which he was to adopt. With regard to the intrinsic merits of his poems, which consist chiefly of ballads and songs, even German critics—such as Schiller, Gervinus, and Vilmar—differ widely in their opinions; but all agree in praising the popular style and fluent, spirited versification of his ballads, *Leonora*, *Lenardo and Blandine*, the *Parson's Daughter of Taubenhayn*, the *Wild Huntsman*, etc. B.'s life was spent in great poverty and misery, partly the result of misfortune, and partly induced by his own errors. He married thrice, in two instances very unhappily; lost his property by an unfortunate speculation; and, though the favorite poet of the German people, was left to earn his bread by translations and similar literary labors. He died June 8, 1794. Though a popular writer, B. was very careful as to style, and was one of the first who wrote good hexameter verse in German. Since 1798, there have been numerous complete and partial editions of his works. See B.'s life by Döring (1826), and by Pröhle (1856).

**BURGERS**, THOMAS FRANÇOIS, 1834-81; b. Cape Colony; ex-pres. of the former Transvaal republic. He was educated at the univ. of Utrecht; made pastor of the Dutch Reformed Church of Hanover, Cape Colony; and on a trial for heresy was acquitted. B. was elected pres. of the Transvaal republic by the Liberals, succeeding Mr. Pretorius, and continuing in office until the annexation of the republic by the British, 1877. In theology B. held rationalistic views; while his presidential policy was remarkable for brilliant but impracticable schemes. See SOUTH AFRICAN REPUBLIC.

**BURGERMEISTER**, the German title of the chief magistrate of a city or town, analogous to the French *maire*, the English *mayor*, and the Scotch *provost*.

**BURGERSDYK** OR **BURGERSDICIUS**, FRANCIS; a Dutch logician, 1590-1629. He was professor of logic and moral philosophy, and afterwards of natural philosophy, at Leyden. His *Logic* was a valuable work; *Idea Philosophiæ Moralis* was a posthumous publication.

**BURGESS**, TRISTAM, LL.D., 1770-1858; b. Mass.; a lawyer, and head of the Rhode Island bar; in 1815, chief justice of the state. In 1816, he was professor of oratory in Brown university; in 1825, elected to congress, where he served ten years. He was a ready, witty, and sarcastic speaker, and had many sharp discussions with the equally ready and sarcastic John Randolph. In 1839, he published *The Battle of Lake Erie, with Notices of Commodore Elliott's Conduct*.

**BURGESS**, a freeman or member of the corporation of a borough or burgh. The word is kindred to the French *bourgeois*, which has come to mean a member of the middle class. Distinction between a burgess and a citizen in the modern use of the words is slight. A burgess was one entitled to full rights of citizenship from his position as a householder or tradesman, and who had been duly enrolled on what is known as the *freeman's-roll*. In former times he was possessed of certain peculiar privileges under the feudal system (q.v.) not belonging to the unenrolled citizen. The term came to be to some extent applied particularly to municipal officers, and thence its use in denoting members of parliament returned from a borough, naturally sprang. In modern times when it is desired to honor a distinguished public guest it is customary to confer upon him "the freedom of the city" (q.v.), which is done by the honorary enrollment of his name as a burgess. In the United States the word is not of general use, though in Pennsylvania and Connecticut, where the borough is a distinct political division, the name burgess is used in the charters of such towns or villages to designate the chief local officer of the place.

**BURGESS**, ALEXANDER, D.D., b. Providence, R. I., 1819; graduated at Brown univ., 1838, and at gen. theol. sem., 1841; ordained priest, in Prot. Epis. church, 1843; rector of St. Stephen's church, East Haddam, Ct.; St. Mark's church, Augusta, Me.; St. Luke's church, Portland, Me.; St. John's church, Brooklyn, L. I.; Christ church, Springfield, Mass. He was pres. of the house of deputies, in the general convention of 1877; and was consecrated bp. of Quincy, 1878. He published a *Memoir* of his brother, the late bp. George Burgess, of Maine.

**BURGESS**, DANIEL, D.D., 1645-1712; an English dissenting divine, who openly avowed Presbyterian principles, and, in Ireland, frequently preached in defiance of the severe laws against non-conformity. He was imprisoned, and upon release went to London, where he soon gathered a large congregation by ardent zeal and the witty and ludicrous illustrations he used in his sermons. He was tutor of Henry St. John, afterwards lord Bolingbroke.

**BURGESS**, EDWARD, yacht-builder; born in West Sandwich, Mass., June 30, 1848; was educated at Harvard, graduating in 1871, and became secretary of the Boston Society of Natural History. In this capacity he devoted several years to editing the publications of the society, and writing certain anatomical memoirs. In 1879 he became instructor in entomology at Harvard, remaining until 1883. Financial reverses caused him to turn his attention to naval architecture, especially as to yachts. After some minor

victories, he was chosen to prepare plans for a sloop-yacht to represent the United States in a forthcoming international contest. From his designs the *Puritan* was built, which easily defeated the *Genesta* (English) and all competitors for the cup in 1885. The triumph was unprecedented, and attracted the liveliest attention. In 1886, his *Mayflower* easily led in the race against the English *Galatea*, which had been sent over to the United States to recover the America's Cup. All efforts to distance his vessels failed. In 1888, his *Carrie E. Phillips* distanced four competitors in the Fishermen's race held in Boston Harbor, and gained the title of "Queen of the Fleet." His *Volunteer*, launched in July, 1887, won the cup against the *Thistle*, the special product of British genius, in the international race of forty miles, raced in 1887. The *Volunteer* was nearly twelve minutes ahead. His latest productions were the *Mariquita*, *Minerva*, and *Gossoon*, all of them being remarkably swift sailing craft. He died in 1891.

**BURGESS, GEORGE, D.D.**, 1809-66; b. R. I.; graduate of Brown University and tutor therein, afterwards studying in Germany. In 1834 he was rector of an Episcopal church in Hartford, Conn., and in 1847 became bishop of Maine, officiating also as rector of a church in Gardiner. He published *The Last Enemy Conquering and Conquered*; *Sermons on the Christian Life*; and a metrical version of a portion of the Psalms.

**BURGESS, JOHN WILLIAM**, educator, was born in Cornersville, Tenn., in 1844; studied at Cumberland University, and then at Amherst College, Mass., where he graduated in 1867. He turned his attention to law, and was admitted to the bar in 1869, when he spent two years as professor of English literature and political economy in Knox College. He went to Europe and devoted two years to study at Göttingen, Leipzig, and Berlin, when, returning to America, he became professor of history and political science at Amherst in 1873. In 1876 he accepted a similar position in Columbia College, New York, adding lectures on international law. In 1878, his title was changed to Professor of International and Constitutional Law and Political Science, and in 1890 he became dean of the faculty of Political Science. In 1892 he published a valuable treatise on political science and constitutional law, and in 1897 a work on United States history entitled *The Middle Period*.

**BURGESS, NEIL**, actor; was born in Boston, in 1846. He began his career on the stage at an early period in his life, and an accident turned his attention wholly to personating female characters. An elderly actress was taken suddenly ill one evening just before the curtain rose, and Burgess hastily assumed her role. The quaint humor he put into the work produced a sensation, and he decided to make a specialty of female character. *Josiah Allen's Wife* was written for him, but his greatest success was doubtless in *Widow Bedott*, in which he first appeared in Providence, in 1879, and at Haverly's, New York, the year following. *Vim*, an old play of his under a new name, was produced at the Bijou Opera House, New York, in 1883, and became very popular. In 1889, he produced *The County Fair*, a play that had a successful run of more than two years in New York theatres.

**BURGH**, another form of the word *Borough* (q.v.). Its use is confined chiefly to Scotch towns and cities incorporated in a manner similar to those of English boroughs. There were originally four classes of burghs: Royal Burghs, Burghs of Barony, Burghs of Regality, and Free Burghs. The first derived their corporate powers from a grant of the Crown; the second from that of a baron, temporal or spiritual; the third were originally Burghs of Barony, but by special royal grant had their powers greatly increased; the fourth, to which class all burghs of our day practically belong, originally asserted their own corporate freedom and were in general free from the great burdens of taxation, etc., common to the other forms of burghs.

**BURGH ACRES** are acres or small patches of land lying in the neighborhood of *royal burghs* (q.v.), usually feued or leased out to burgesses or persons resident within the burgh. A Scotch act of parliament, passed in 1695, relating to the division or partition of lands lying runrig, excepts burgh acres, or, as the act calls them, "burrow and incorporat acres," from its provisions; but this is to be understood only of royal burghs, and not of burghs of barony or others.

**BURGHES**, a name popularly given to a religious denomination in Scotland. See UNITED PRESBYTERIAN CHURCH.

**BURCKHAIR, HANS**, a noted old German painter and wood-engraver, was b. at Augsburg, 1473. He was the father-in-law of the elder Holbein, and the friend of Albert Dürer, whose influence is manifest in B.'s works. Several excellent paintings by B. are preserved in the galleries of Munich, Berlin, Augsburg, and Vienna. But he is best known as a wood-engraver; his cuts amounting in all to nearly 700. Among the most celebrated of these is his "Triumph of the Emperor Maximilian," in 185 cuts, with a description by the emperor himself. Another fine series of 237 cuts, called "The Wise King," represents the deeds of Maximilian. B. d. at Augsburg, in 1531.

**BURGLAR ALARM.** See ELECTRIC BELLS.

**BURGLARY**, as a common law offense, was defined by Coke to be the breaking and entering by night into the mansion-house (that is, in modern parlance, dwelling house) of another with intent to commit a felony therein. Every essential word of this definition contains an element that is necessary to the completion of the crime. (1) There



must be a breaking, actual or constructive. But the breaking does not necessarily imply violence; thus, the lifting of a latch, or undoing of a window fastening, or even the compelling by threats of violence of the unlocking of a door from the inside, constitutes a breaking. It has been said that it is a burglarious breaking to come down a chimney because it is "as much closed as the nature of things will permit." The breaking may even be for the purpose of exit; thus, if one enters a house by an open door with the intent to steal and it is afterward locked and he breaks his way out, he completes thereby the crime of burglary. To enter an open door or window or climb through an aperture already made is not a breaking. One who has lawfully entered one part of a house which is divided into separate residences may be held guilty of burglary if he break into another part. (2) The *entering* need not be of the whole person; the insertion of the hand, or even of an instrument or tool, for the purpose of completing the felony is sufficient to bring the offense under the head of burglary. Thus, where a man breaks a window and inserts a cane or hook to draw out goods, the offense is common-law burglary, other conditions agreeing. The entering need not, in time, be instantly after the breaking, but it must be connected with it as part of the criminal intent, as where a man breaks a window open on one night and returning the night after, completes the crime. (3) The building entered must be a dwelling-house, or a part thereof, in actual use as a residence, and to which the person accused has no legal right of entrance; for the purpose of the definition any out-house properly appurtenant to the dwelling is a part thereof. This would not include, however, a distant barn or disconnected store-house, or the like. Apartments under the same roof used for residence, and entered through separate outside doors form separate dwelling-houses in the legal sense; so are also suites of rooms in a college or lodging-house where the actual owner does not reside. A curious distinction was made by old English courts by which a church was held subject to burglary as being "the dwelling-house of God." (4) The breaking and entry must be in the night-time. This is considered to include the time between the disappearance of daylight and its re-appearance in the morning; daylight is further defined as existing when a man's face can be distinguished thereby; the existence or absence of moonlight has no effect in the consideration of this point as "the malignity of the offense does not so properly arise from its being done in the dark as at the dead of night." (5) There must be intent to commit a felony. It is immaterial whether the intended felony be larceny, arson, rape, or murder; but in the last three cases, as the offense is greater than that of burglary alone, the prosecution would naturally be for the most serious crime or its attempt. If no felonious intent exists, the breaking and entering in the night amount only to trespass. The common law limitation of burglary has been changed by the statutes of many of the United States; in some, common-law burglary and statute burglary exist side by side; in others, statute burglary is defined as of a second degree to common-law burglary. The extension of the definition of the crime in some states covers the breaking and entry in the day-time as well as the night, and of shops, factories, warehouses, etc., as well as of dwelling-houses. In a few of these states, burglary has been extended practically to cover the breaking and entry of any building at any time with intent to commit any crime. The punishment for burglary under the English law extended even to penal servitude for life; in this country in none of the states, we believe, is a sentence of more than twenty years' imprisonment laid down by the statutes.

**BUR'GLEN**, a village of Switzerland, in the canton of Uri, about 2 m. from Altorf. It is celebrated as the birthplace of William Tell.

**BURGOMASTER**. See GULL.

**BURGONET**. See ARMOR, HELMET.

**BURG'OO**, a name used in some parts of the United States for barbecue (q.v.). The reader is also referred to Norton's *Political Americanisms* (1890).

**BUR'GOS**, a city of Spain, capital of the new province of the same name, and of the former kingdom of Old Castile, is situated in a fertile valley at the foot of the Sierra d'Oca, and on the right bank of the river Arlanzon, in lat. 42° 20' n., and long. 3° 45' w. Pop. '87, 81,801. B. is a very ancient place, having been founded in 844. Many of the gloomy old houses of its early history still remain. In the castle of B., Edward I. of England was married to Eleanor of Castile. The cathedral of B., founded in 1231, is one of the noblest specimens of Gothic architecture in Spain. Its various chapels are rich in fine sculpture and tombs. It was the birthplace of the Cid (q.v.).

**BURGOYNE**, JOHN, a British general and dramatist, b. 1723; son of lord Bingley, early entered the army, and in Aug., 1759, was appointed lieut.col. commandant of the 16th light dragoons. In 1761, he served at Belle Isle, and in 1763 commanded a force sent into Portugal for the defense of that kingdom against the Spaniards, when he surprised and captured Alcantara. In 1776, he served in North America, and in the summer of 1777 he was appointed to the command of a large force ordered to penetrate from Canada into the rebellious districts. The early part of the expedition was marked by his capture of Ticonderoga; but neglecting to preserve his communications with Canada, he encountered the greatest difficulties, and was at last obliged to surrender with his army to Gen. Gates at Saratoga. Soon after his return to England, having been denied an audience of the king, and refused a court-martial, he went over to the opposition party, and voluntarily resigned all his appointments. On a change of ministry, at the close of

the American war, he was appointed commander-in-chief in Ireland. This office he resigned two years after, and subsequently seems to have devoted his time to light literature. He was the author of some pamphlets in defense of his conduct, and of *The Maid of the Oaks* (1780); *The Heiress* (1786); and other stock dramatic pieces. B. was one of the managers for conducting the impeachment of Warren Hastings. He died in 1792. See *Episodes from the Life and Letters of B.*, by Barrington and Foublanque (1876).

**BURGOYNE**, Sir JOHN FOX, Bart., an eminent English engineer, b. in 1782, entered the royal engineers in 1798. From 1800 to 1807, he served in the Mediterranean; was with Moore at Corunna in 1809; and served under sir Arthur Wellesley in the peninsula till the conclusion of the war in 1814, being present at all its sieges. In 1814 he was commanding engineer of the expedition to New Orleans, and in 1826 of that sent to Portugal. In 1851, he obtained the rank of lieut.-gen., and in 1854 was made D.C.L. of Oxford university. In the Crimean war, he was chief of the engineering department of the British army till recalled in 1855. For his services at Sebastopol, he received from the sultan the order of the Medjidie, and from the French emperor that of grand officer of the legion of honor. He was made gen. in 1855, and created a baronet in 1856. He died 7th Oct., 1871. Author of *Our Defensive Forces* (1868), etc.

**BURGRAVE** (Ger. *burg*, castle, fortress; *graf*, count), in feudal times in Germany, an officer appointed to the command of some fortress situated at some strong place or point otherwise important. Occasionally, the jurisdiction of the burgrave extended to the country immediately surrounding the stronghold proper. The burgraves were commonly subject to some ecclesiastical prince who had attained in the state the position of a *graf* (q.v.), but allowed the administration of those rights to be in the hands of the burgraves, who obtained the right of private justice and of imposing taxes. There were also royal burgraves. The most famous of the ecclesiastical burgraves were those of Mainz, Meissen, and Magdeburg; of the royal, the most noted was that of Nürnberg, held by the Hohenzollern family. The office of burgrave soon became hereditary.

**BURGUNDY**, the name of a once independent kingdom of wide extent, but most frequently used of an old French province (Fr. *Bourgogne*) now divided between the departments of Côte-d'Or, Saône-et-Loire, and Yonne. The ancient Burgundians (*Burgundi* or *Burgundiones*), originally a German tribe, were at first settled on the banks of the Oder and the Vistula, and afterwards extended themselves to the Rhine and the Neckar, and, in 407, penetrated into Roman Gaul. Their conversion to Christianity took place in the course of eight days! They adopted a brief Arian confession of faith, and were baptized. From 407 to 534, the kingdom of B. was several times divided; and in 451, Gundicar, king of B., with 10,000 men, confronted Attila, but was defeated and slain.

In 534, B. passed under the rule of the Franks; but the weak government of the later Carlovingian kings allowed a part of it once more to assert a separate existence as a dependency of the empire under Boso of Vienne in 832. Boso's realm, known as Cisjuran B., or the kingdom of Arelate (Arles), lay mainly in the basin of the Rhone. A second Burgundian state arose about the same time in the country between the Saône and the Reuss, and was known as Transjuran or Upper Burgundy. These states, united in 930, were for a time powerful and famous; but in 1038, on the extinction of the royal dynasty, B. became part of the German empire. It was afterwards broken into several fragments, which were gradually absorbed by France.

A similar fate befell the third Burgundian state, the dukedom of B. or Lower B., which was formed by a brother of Boso. Yet the dukes of B. played a large part in the history of mediæval Europe, and were long the dangerous rivals of the French kings. The nucleus of the dukedom was in Lower B., the region which afterwards became the French province of B., to the n. and w. of the other Burgundian realms; but the second line of dukes, beginning in 1363 with Philip the hardy, son of the French king John, held under their sway not only Franche Comté and adjoining portions of France proper, but great part of the Low Countries. Charles the bold (q.v.) was one of the most powerful sovereigns of Europe. Louis XI. of France succeeded in incorporating the duchy with the kingdom of France.

**BURGUNDY**, Louis, Duke of, the grandson of Louis XIV. of France, and dauphin of France after the death of his father, was b. at Versailles in 1682. Even in childhood he was ungovernable, and became excessively violent and haughty, and abandoned to all gross and sensual passions. Although educated under the care of the abbé Fénélon, he used, when 30 years of age, to divert himself with drowning flies in oil, and blowing up living frogs with gunpowder. He had the misfortune to be deformed; his deportment and manners were undignified, and his mind was imbued with bigotry. When only about 15 years of age, he was married to the princess Adelaide of Savoy, and spent his time wholly in amusements in the company of his spouse, and of the ladies of the court. Nevertheless, in 1701, he was nominally appointed generalissimo of the army, really under the command of the duke de Vendôme, and is said to have shown some spirit in a cavalry-fight at Nimeguen; but he quarreled with Vendôme, chiefly because he had once been compelled to establish his head-quarters in a nunnery. He lost the respect of the army, and was exposed to many humiliations, partly proceeding from intrigues set on foot against him out of envy by his father. He returned to the court more eccentric, gloomy, and unsociable than before. But when he became, on his

father's death, the second person in the kingdom, all his defects vanished from the sight of the courtiers, and flattery bestowed on him the title of the great dauphin. He died suddenly in the year 1712. A few days previously, his wife and her son, the duke of Bretagne, had died, and the same hearse carried father, mother, and child to St. Denis. The duke of Orleans, subsequently regent, and his daughter, the duchess of Berri, were accused, but without reason, of having caused them to be poisoned.

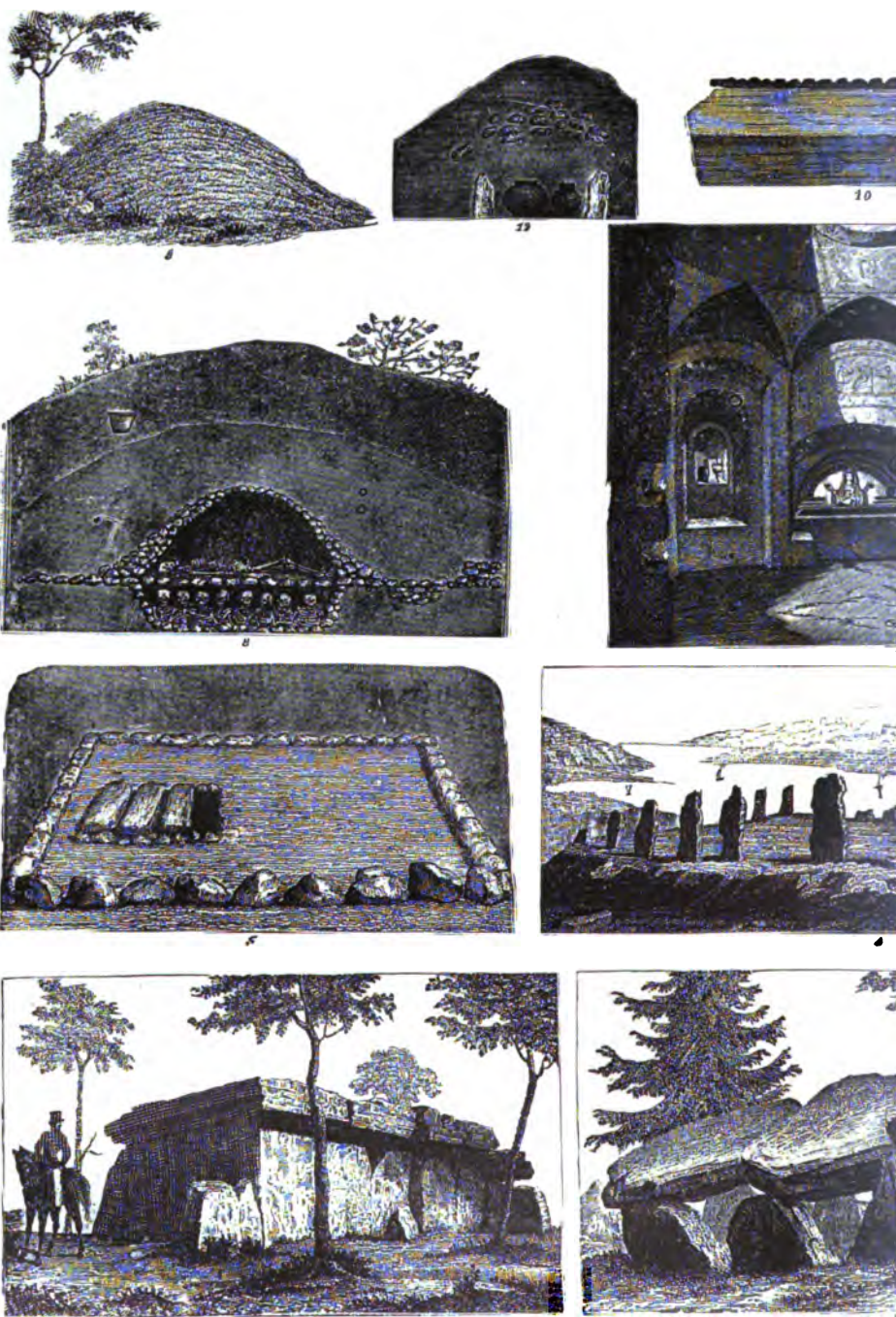
**BURGUNDY PITCH**, a resinous substance prepared from common frankincense (q.v.), the spontaneous exudation of the Norway spruce-fir (*abies excelsa*; see FIR) by melting it in hot water, by which means it is freed from a considerable part of the volatile oil which it contains. By straining it through a coarse cloth, impurities are also removed. B. P. is of a yellowish-white color, hard and brittle when cold, but softening by the heat of the hand, and readily adhering to the skin. It has a not unpleasant resinous odor, and a slightly bitter taste. It is used in medicine as an external application only, and generally acts as a mild irritant. A very common application of it is as a plaster in complaints of the chest, and in rheumatic complaints. It enters also as an ingredient with resin, oils, etc., into a compound plaster of similar use. The B. P. of commerce is now principally brought from Hamburg; but the greater part of what is sold under that name is really manufactured of common resin and palm-oil, or from American turpentine. It has a fuller yellow color than the genuine B. P., and a less agreeable odor.

**BURGUNDY WINES** are chiefly the produce of vineyards cultivated on the hilly lands forming the Côte d'Or, between Dijon and Chalons. These hills average about from 800 to 1000 ft. in height; the vineyards ascend up the slopes in terraces, and spread along the table-land on the summit. "In richness of flavor and in perfume, and all the more delicate qualities of the juice of the grape, the wines grown here unquestionably rank as the finest in the world." The most celebrated of the red wines of Burgundy are the Closvougeot (near Beaune), Nuits, Chambertin (the favorite wine of Louis XIV. as well as of Napoleon), the Romané-Conti, Richebourg, Volnay, and Pomard. Of other red wines of Burgundy not grown on the Côte d'Or, those of Pitoy, Perrière, Preaux, and Auxerre are held in most repute. The white wines of Burgundy are also the finest in France, but being produced in less quantity, they have less celebrity. A comparatively small portion of the wine produced is consumed in the district, the rest being exported to all parts of the world.

**BURHÁNPUR**, a t. in British India, 280 m. n.e. of Bombay, 21° 31' n., and 76° 20' e.; 2 m. from the railway station of Lalbagh. It was founded in 1400, and was the chief seat of the government of the Deccan provinces of the Mogul empire until 1635. In 1861, it was ceded to the British government. Pop. '91, 31,200. B. is celebrated for its muslins, flowered silks, and brocades.

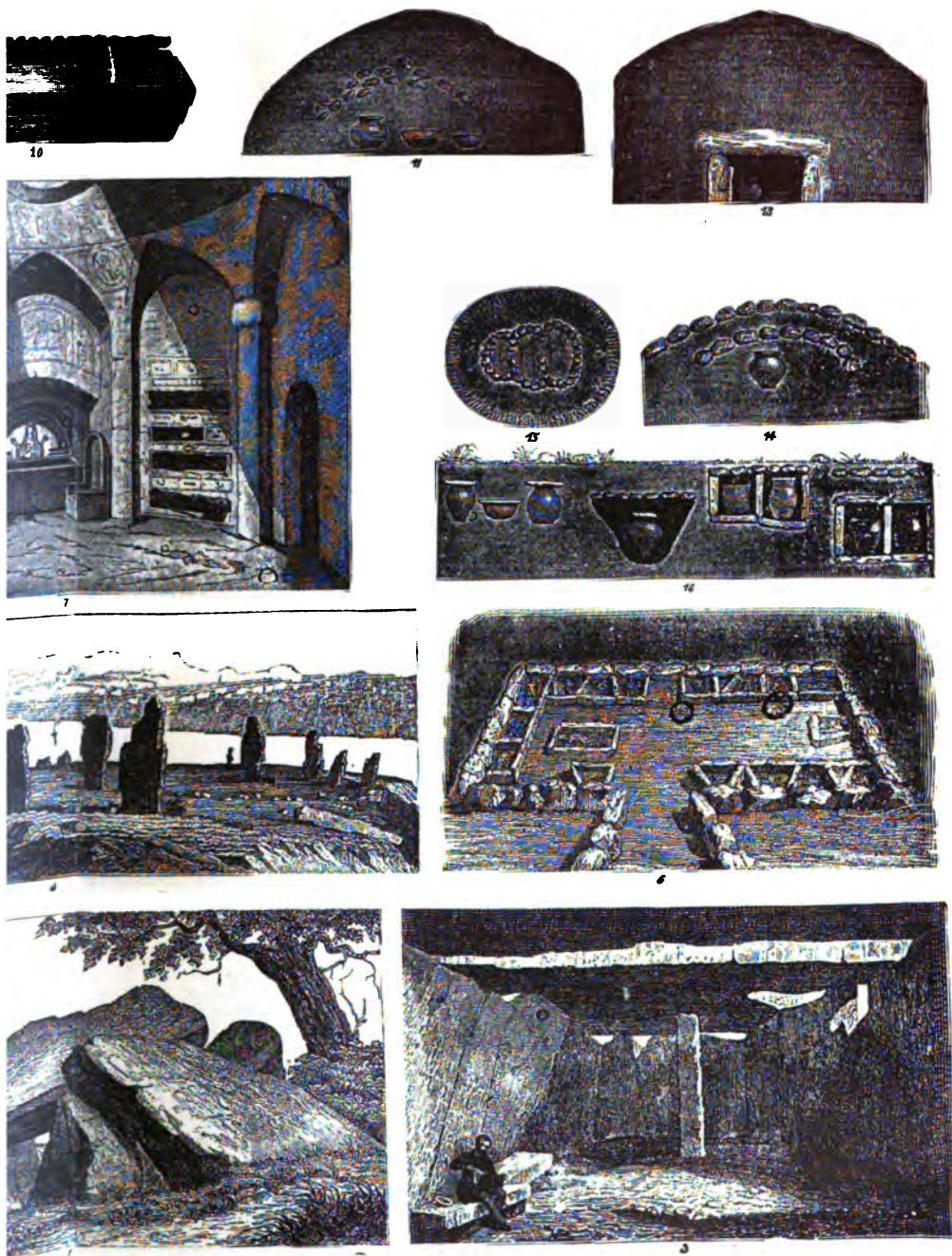
**BURIAL**, a word of Teut. origin (Ang.-Sax. *birgan*, to conceal), is applied to the prevalent method among civilized nations of disposing of the dead, by hiding them in the earth. As there is almost nothing else so deeply interesting to the living as the disposal of those whom they have loved and lost, so there is perhaps nothing else so distinctive of the condition and character of a people as the method in which they treat their dead. Hence, funeral customs associate themselves with a wide variety of sentiments, from gentle and rational sorrow, up to deification of the departed, accompanied sometimes with cruelty and ferocity towards the living. People of a low and barbarous type carelessly permit the remains of the dead to lie in the way of the living, and there are a few instances in which the object of artificial arrangements has been to preserve a decorated portion of the body—as, for instance, a gilded skull—among survivors. The general tendency of mankind, however, has always been to bury the dead out of sight of the living; and various as the methods of accomplishing this end have been, they have resolved themselves into three great classifications: 1. The simple closing up of the body in earth or stone; 2. The burning of the body, and the entombing of the cinders; and, 3. The embalming of the body. The first of these seems to be the earliest form of which we have any record, and it is the form most amply sanctioned by the existing practice of the civilized world. It is the method referred to in the earliest scriptures, and all are familiar with the touching scene in which Abraham buries Sarah in the cave in the land of Canaan which belonged to Ephron, but was, after a solemn and courteous negotiation, secured to Abraham for a possession to bury his dead in (Gen. c. 23). The horrible fate of being left unburied, either from scorn or neglect, is powerfully told in the prophecy of Jeremiah against Jehoiakim: "He shall be buried with the burial of an ass, drawn and cast forth beyond the gates of Jerusalem." There is frequent allusion in the later scriptures, and especially in the New Testament, to the embalming of the body in antiseptics and fragrant substances; and the burning of the bodies of Saul and his sons is accounted for by commentators on the supposition that they were too far decayed to be embalmed. The Israelites may have learned the practice of embalming from the Egyptians, among whom it was an art so greatly cultivated and extensively practiced, that Egyptian corpses, as inoffensive as any article of wood or stone, are scattered over Europe in museums, and are even to be found as curiosities in private houses. The soil and climate of upper Egypt seem to have afforded facilities for





BURIALS, ETC.—1. Hun's grave (Lower Saxony). 2, 3. "Fairy grotto" at Saumur. 4. S. gothland). 7. Catacombs: place of burial and worship. 8. Grave for chieftain and 16. Grave in level ground.





4. Standing stones (Stennis, Orkney). 5. Hun's bed (Mecklenburg). 6. Giant's room (West-  
 ain and slaves (Mecklenburg). 9-15. Mound graves with ash-urns. 10. Old German wood-coffin.



embalming unmatched in any other part of the world; and in other places the vestiges of the practice are comparatively rare, though it is usual even yet to embalm royal corpses, and in some places to preserve a series of mummies, as in the vault of the monastery of Kreuzberg, at Bonn, where the monks have been successively preserved in their costume for centuries. The practice of incremation, or of the burning of the body, and the entombing of the ashes, deserves more inquiry than it has yet obtained. In Greece, in Etruria—both before and after it came under the Romans—and in the n. of Europe, the simple burial of the body, and its prior reduction to ashes, were both practiced, and sometimes contemporaneously. The tombs of Etruria are rich in art, much of it going to the adornment of the urns of baked clay in which the ashes of the dead are kept. Vessel of *terra-cotta*, or cooked earth, containing human remains, have been found, often so large that they appear to have served as coffins for containing the whole body. Vessels of this kind were found in the valley of the Scamander by some British officers while spending their leisure time after the siege of Sebastopol, upon the ground supposed to have been occupied by the besiegers of Troy. Smaller cinerary urns have been found over so extensive a portion of the world, that it is difficult to define the limits to which they belong. The Danish antiquaries say, that in their stone period, when the use of metals was unknown, the dead were all buried unburned in stone chambers, and that the burning of the bodies and the preservation of the ashes in urns came in with the age of bronze. These antiquaries associate with the older system those amorphous mounds of earth or stone called barrows or tumuli, which are to be found all over the n. of Europe. Mr. Bremner, in traveling among the steppes of the Ukraine, saw multitudes of these small mounds, which reminded him at once of what he had seen on the plain of Troy, at Upsala in Sweden, in Scotland, and in Ireland. The Irish tumulus of New Grange is perhaps the most remarkable of all, forming a connecting link between the simple barrow on the moor and the pyramids of Egypt, which are the perfection of the same kind of structure applied to the same purpose—the burial of the distinguished dead. These structures open up a large field of curious inquiry. The simple theory, that they were raised over the dead, has lately been disturbed by the discovery that many of them are not artificial, but relics of sheets of alluvial matter, the mass of which has been carried away; and even in these, human remains have been found, the natural mounds having been used as monuments. Even when human remains are connected with barrows, cromlechs, or the large shapeless pillars commonly called Druidical, it is often questionable whether the monument was made to receive such remains. It is certainly ascertained to have been a practice in ancient times to bury bodies in tombs which were themselves ancient when they received their inmates.

Some of the grandest buildings in the world have been tombs; such are the pyramids, the castle of St. Angelo, the tomb of Cæcilia Metella, and many temples scattered over Hindustan and other eastern countries. Thus, the respect paid by the living to the dead has preserved for the world many magnificent fruits of architectural genius and labor. A notion that the dead may require the things they have been fond of in life, has also preserved to the existing world many relics of the customs of past ages. The tombs of Egypt have supplied an immense quantity of them, which have taught the present age more of the manners of ancient nations than all the learned books that have been written. It is an awful remembrance, at the same time, that inanimate things were not all that the dead were expected to take with them. Herodotus tells us of favorite horses and slaves sacrificed at the holocaust of the dead chief. The same thing has been done in our own day in Ashantee. In many countries, the wives had the doom, or privilege, as it was thought, of departing with their husbands; and down to the present generation the practice has lived in full vigor in the Hindu suttī. Among the Jews, the Greeks, the Romans, and many ancient nations, the dead were buried beyond the towns. The "stop, traveler!" was a usual memorandum on Roman tombs. In Christian countries, if the remains of the saint to whom a church was dedicated could be obtained—or anything passing for the remains—they were buried near the altar in the choir. It became a prevalent desire to be buried near these saints, and the bodies of men eminent for their piety, or high in rank, came thus to be buried in churches. The extension of the practice was the origin of churchyards. See Feydeau, *Hist. des Usages Funèbres* (1846).

**BURIATS**, a Mongolian people in the vicinity of lake Baikal. They are scattered in various tribes that take the names of their special localities; and the tribes are subdivided according to kinship. Their number is estimated at 208,000, and they live chiefly in the Russian government of Irkutsk. They have high cheek-bones, flat noses, and sparse beard on the chin; they shave the head, leaving a cue at the top, like the Chinese. In summer they dress in wool and cotton; in winter in sheep-skins and furs. Rearing cattle is their chief occupation, and some of them possess large herds. The soil is fertile, and they have an elaborate system of irrigation. Some activity is shown in trapping and fishing. In religion they are mainly Buddhists, their chief lama living at Goose lake. Some are Shamanists, and their sacred spot is the Shamanist stone at the mouth of the Angar river. About 10,000 are Christians. Reading and writing are



general among the B., and they have books of their own, translated from the Thibetan. Their language is Mongolian, and in three distinct dialects. The Russians first explored the region in 1631, and permanently subdued the B. before the end of the 17th century. A grammar of their language was prepared by Orloff (1878). See *illus.*, *ASIA*, vol. I.

**BURIDAN, JEAN**, a scholastic metaphysician of the nominalist party, was b. at Methune, in Artois, in the 14th c., and studied at Paris under Occam, where he also became a teacher of philosophy. The events of his life, as well as the manner of his death, are very obscure. One account states that he was thrown into the Seine by command of Marguerite de Bourgogne, daughter-in-law of Philippe le Bel, whose infidelities he had rebuked. Another, later, but less mythical-looking account, states that B. was driven from France as a disciple of Occam, and fled to Austria, where he founded a school. His elucidations of Aristotle are among his most useful writings. In his *Logic*, his great endeavor was to facilitate the discovery of middle terms for all kinds of syllogisms. The celebrated sophism known to the schoolmen under the name of BURIDAN'S ASS, has been discussed at superfluous length, and with needless ingenuity, by Bayle. It is not at all likely that it was ever adduced by B., but more probably by his adversaries, who wished to ridicule his metaphysical doctrine of *Determinism*—viz., that in every mental and bodily action the will must be determined by something out of itself. The sophism referred to is that if a hungry ass be placed exactly between two bundles of hay of equal size and attractiveness, it must starve, as there is nothing to determine the will of the animal towards either bundle. His chief works are *Summula Dialectica* (Paris, 1487); *Compendium Logicae* (Venice, 1489; Oxford, 1637); *In Aristotelis Metaphysica* (Paris, 1518).

**BURIN, or GRAVER**, the principal instrument used in copper-engraving, is made of tempered steel, and is of prismatic form, the graving end being ground off obliquely to a sharp point. The style of a master is frequently described by the expressions *soft B.*, *graphic B.*, *brilliant B.*, or whatever other character may belong to it.

**BURITI PALM**, *Mauritia vinifera*; see MAURITIA; a beautiful palm which grows in great abundance in the swamps of some parts of the n. of Brazil. It is one of the loftiest of palms. Its leaves are fan-shaped, and form a large globular head at the top of the stem. It produces a great number of nuts about the size of a small hen's egg, covered with rhomboidal scales arranged in a spiral manner. Between these scales and the albuminous substance of the nut, there is an oily reddish pulp, which is boiled with sugar, and made into a sweetmeat. An emulsion is also prepared from it, which, when sweetened with sugar, is a very palatable beverage, but if much used, is said to tinge the skin of a yellow color. The juice of the stem also makes a very agreeable drink; but to obtain it, the tree must be cut down, when several holes about 6 in. square, 3 in. deep, and 6 ft. apart, are cut in the trunk with a small axe; and these in a short time are filled with a reddish-colored liquid, having much the flavor of sweet wine.

**BURKE**, a co. in e. Georgia, on the Savannah river and the Central Georgia railroad; 1090 sq. m.; pop. '70, 17,639—13,436 colored; in '90, 28,501. Surface hilly, with fertile soil, producing corn, sweet potatoes, and cotton. Co. seat, Waynesboro.

**BURKE**, a co. in w. North Carolina, on the Catawba river and the Southern railroad; 620 sq. m.; pop. '90, 14,939, includ. colored. Surface mountainous, with fine scenery; productions agricultural. Co. seat, Morganton.

**BURKE, EDMUND**, a philosopher and politician, distinguished over all the men of his times for eloquence and political foresight, was b. 1728 or 30, in Dublin, where his father had an extensive practice as an attorney. As a schoolboy, he displayed those traits of character and the germs of those powers which ultimately gave him greatness. In 1744, B. entered the university of Dublin, of which he became a scholar. His undergraduate course was not unmarked by the ordinary distinctions of successful application; but it would appear that he mainly devoted himself to his favorite studies of poetry, oratory, history, and metaphysics. In Feb., 1748, he graduated B.A., and in 1751 took his degree as master of arts. In the interval (1750), being destined for the English bar, he proceeded to London, to keep his terms at the Middle Temple. To legal studies, however, he never took kindly, and ultimately he abandoned the idea of becoming a barrister. During the years 1750-56, he would appear to have occupied himself in traveling through England, enjoying the society of literary men, in study, and finally in writing for various periodicals.

B., when yet at the university, had achieved a local reputation for literary talent and eloquence. Among the compositions of his undergraduate life the most noticeable perhaps is his translation of the conclusion of the second Georgic of Virgil, which shows poetic talent of no mean order. His first important publication, however, was the celebrated *Vindication of Natural Society*, written in imitation and ridicule of the style and reasoning of lord Bolingbroke, in which, with well-concealed irony, he confutes his lordship's views of society by a *reductio ad absurdum*. This work, published anonymously in 1756, at the age of 26, attracted considerable attention. Soon after, in the same year, appeared his well-known essay, *A Philosophical Inquiry into the Origin of our Ideas of the Sublime and Beautiful*—a work containing a comprehensive induction of the various sources of the ideas referred to, but which must be pronounced a failure, so far

as it pretends to analyze into their primary elements the emotions of the sublime and beautiful.

The essay on the *Sublime and Beautiful* attained a rapid popularity, and its author soon found himself courted by all the eminent men of his time. Garrick was already one of his friends; among them he soon could count Reynolds, Soame Jenyns, lord Lyttelton, Warburton, Hume, and Dr. Johnson. Notwithstanding this popularity, however, his progress continued slow; for three years yet, he had to occupy himself with periodical writing, devoting his leisure principally to political subjects. What is considered a joint work of B. and his cousin, William Bourke, appeared in 1757—viz., *An Account of the European Settlements in America*—and shows how carefully at this date he had studied the condition of the colonies. In 1761, Mr. W. G. Hamilton ("Single-speech Hamilton"), then secretary for Ireland, having appointed him his private secretary, he returned to Dublin, where, during two years' service, he demonstrated his aptitude for political business, receiving in 1763, in reward of his services, a pension on the Irish establishment of £300, which, however, he did not long enjoy.

Returning to London, B., in 1764, along with Reynolds, founded the literary club, the history of which is associated with almost every considerable name in the literature of the period. But literary society did not call off his attention from the chances of a political career. He became private secretary to the marquis of Rockingham, on his becoming premier, and at the same time entered parliament as member for Wendover. Here his eloquence at once made him the reputation of being "the first man in the commons." The Rockingham administration, however, lived only a few months, and with it terminated this his second political employment. To trace his subsequent career in parliament is more than the limits of this article will allow; it must suffice to state briefly that his parliamentary life extended from 1766 to 1794 without intermission; that he was successively member for Wendover, Bristol, and Malton; twice held the post of paymaster of the forces, once under Rockingham, and again under lord North, with the standing of a privy counselor; that after a career in parliament remarkable for the laboriousness, earnestness, and brilliancy with which every duty was discharged, and extending over nearly 30 years, he retired at last, receiving the thanks of the commons for his numerous public services, and rewarded by government, on the express request of his sovereign, with pensions amounting in all to £3700. It would be wrong, however, to omit that, as paymaster of the forces, he, with a scrupulous regard to public economy, sacrificed all the perquisites of his office, exhibiting a severe integrity unexampled among public men; and that in his relation with the constituency of Bristol, which was alienated from him by his advocacy of the claims of the Roman Catholics and of the opening up of the trade of Ireland, he was the first to maintain the doctrine of the independence of parliamentary representatives—that they are not machines to vote for measures approved by their constituencies simply for that reason, but men and thinkers chosen by them to calmly consider and legislate for the good of the commonwealth. It must also be mentioned, that during his career he rendered more important service to the cause of humanity than any man of his time: he prepared the way for the abolition of the slave-trade, a measure which was destined to ripen to success in the hands of Wilberforce; he advocated the cause of humanity in India against the voracious greed of stockholders, who regarded its millions simply as materials for plunder, and largely contributed to improve the government of that country. Towards America he advocated a policy of justice and conciliation, which, had it been adopted, would have averted the horrors of the war of independence, and retained the colonies in amity with the mother-country. And to the advocacy of every cause which he espoused, he brought a capacity for patient research that was unlimited, and an eloquence that has never been transcended.

Before proceeding to remark on the character and powers of B., a very brief notice must be taken of his leading literary efforts connected with his political labors. Little more than a catalogue can here be given of them. Omitting a variety of valuable letters—several on the condition of Ireland—notice must be taken of his *Observations on a Pamphlet on the Present State of the Nation*, being his first political pamphlet, published in 1769, in answer to one variously ascribed to Fox or Grenville. In 1770, he published a pamphlet, *On the Cause of the Present Discontents*. On the 18th Feb., 1788, he commenced his celebrated speech opening the trial of Warren Hastings (q.v.), the most remarkable trial, perhaps, in the history of the world. This speech lasted over four days, and has been characterized as "a tempest of invective and eloquence." No idea can be conveyed of the effect which it produced. The trial lasted seven years, and closed with another great and splendid oration from B., lasting over nine days. Hastings, it is well known, was acquitted. While this trial was advancing, B. found time to take part in all the current business. In 1790, appeared his *Reflections on the Revolution of France*, which sold in tens of thousands, and is said to have produced an effect never produced before nor since by any political essay. Hereafter, the world showered honors on B., of which space forbids even the enumeration. Having, in 1791, withdrawn from the whigs on the French question, he offered for the consideration of government, *Thoughts on French Affairs*, which, however, was not published till after his death. *Heads for Consideration on the Present State of Affairs and Reply to a Noble Lord*, next followed, the latter being relative to himself personally. His last work,

*Thoughts on a Regicide Peace*, showed that he retained to the end of his life his whole powers unimpaired.

Few men have been the subjects of higher panegyric than B., and, on the whole, few have better deserved praise. He was noble-minded, pure in his life, and a purist in politics. Intellectually, he was most richly endowed; with much imagination, rare powers of observation, and indefatigable industry, there was no subject which he could not master, and none which, having mastered, he could not expound with unparalleled richness of language. But with these virtues and powers were conjoined defects, which, without bating their greatness, largely neutralized their influence. He was, it may be said, too literary to be a philosopher, and too philosophic to be a politician. His career would seem to illustrate this position. His oratory astounded by its brilliancy rather than persuaded by its tone and argument; and in the long-run, the eloquence which failed to command the reason, ceased to captivate the ear. The man who at first evoked the enthusiasm of the house by the brilliancy and power of his eloquence, did actually at last empty it by persistence in the monotonous splendors of his speeches. Passionate, and in a great degree untractable, he was unsuited for party politics, and drifted from all his connections, breaking up slowly all party ties, and even the ties of friendship, till he reached at last a state of almost political isolation. At the same time, it must not be forgotten how great an influence he, half philosopher, half politician, exercised on the counsels of the state; many of his views on politics and public economy were anticipations of science, as many of his previsions of the course of events were prophecies.

B. died on the 7th July, 1797. A collected edition of his works in quarto was published in 1827. The latest edition is from the Clarendon press, begun 1866. See Mac-knight's biography of B., and Morley's *Edmund Burke, a Historical Study* (1899).

**BURKE**, SIR JOHN BERNARD, b. 1815; son of John, who started *Burke's Peerage*, and continuing the work after the father's death. He was called to the English bar in 1839, became Ulster King of Arms in 1853, and was knighted in 1854. He published, besides the *Peerage and Baronetage, History of Dormant, Abeyant, Forfeited, and Extinct Peerages; History of the Landed Gentry; Vicissitudes of Families*, etc. He d. in 1892.

**BURKE**, THOMAS M., known as "Father Tom," 1890-88; b. Galway, Ireland; studied theology in Rome and Perugia; joined the order of St. Dominic, and after remaining five years in Italy was sent by his superiors to England. He soon established a reputation as an orator; preached in Ireland, England, and Italy; and, in 1872, visited the U. S., where his course of lectures in answer to Froude excited much attention. His lectures were reprinted under the title of *English Miracles in Ireland*, 1873.

**BURKE**, THOMAS MARTIN ALOYSIUS, clergyman; b. in Utica, N. Y., in 1840; educated at the college of St. Michael, Toronto, and at St. Charles college (Md.); ordained to the Roman Catholic priesthood in 1864; assigned to duty at Albany, N. Y.; became vicar-general of the diocese in 1887; and was consecrated the fourth bishop in 1894.

**BURKING**. A name given to the crime of murder committed for the purpose of providing surgeons with anatomical "subjects," so called from a murderer named Burke.

**BURLEIGH**, WILLIAM CECIL, Lord. See CECIL.

**BURLESON**, a co. in Central Texas, on Brazos river; 640 sq. m.; pop. '90, 18,001, incl. colored. It has an uneven but productive soil, about two thirds covered with oak forests. Productions, corn, cotton, and wool. Co. seat, Caldwell.

**BURLESQUE** (from Ital. *burla*, jest, mockery), denoting a style of speaking, acting, writing, drawing, is a low and rude grade of the comic. The legitimate comic brings together contrasts with a final view to harmonizing and reconciling them; the B. distorts and caricatures, and brings the incongruities into stronger relief. The farce is the B. of comedy. Deformities and monstrosities that excite disgust do not belong to the burlesque. The lofty and the abject, the great and the little are conjoined, with the sole view of exciting a laugh. Nor does the true B. turn real greatness and nobility into laughter, but only sham greatness—false pathos, and all hollow pretension and affectation. The B. style appears to have been unknown to the ancients; it originated among the Italians, more particularly with the poet Berni (q.v.). The genuinely national *buffone* of the Italians personates the burlesque. Carlo Gozzi, in his tragi-comedies, is perhaps the greatest in the B. vein. Scarron among the French, and *Huadibras* in English, are examples. Parody or travesty (q.v.) is a species of burlesque.

**BURLETTA**, a comic operetta or musical farce.

**BURLINGAME**, ANSON, LL.D., 1820-70; b. N. Y.; educated in Michigan and Harvard universities, and practiced law in Boston. He was chosen to the state legislature and the constitutional convention. He was an early worker in the free-soil party when Van Buren was the presidential candidate; and was also a leader in the American party in 1854, and by them sent to congress. His denunciation of Brooks's assault upon Senator Sumner provoked a challenge from the South Carolinian, which the Massachusetts member at once accepted, naming rifles as the weapons. Brooks did not fight. Burlingame was a congressman until 1861, and in that year was sent as minister to Austria, where the feeling against him because he had favored Hungarian independence led to a positive refusal to receive him as a diplomatic representative. He was then sent to China, where he was successful in negotiating certain treaties favorable to both countries, and for the first time securing China's recognition of international rights of property, trade, and worship. In 1869, having gained the full confidence of the Chinese

government, he was sent as minister of the Chinese Empire to Russia and other European countries, but died in St. Petersburg soon after entering upon his duties.

**BURLINGTON**, a co. in central New Jersey, between the ocean and the Delaware River; 860 sq. m.; pop. 1890, 58,528. Co. seat, Mount Holly.

**BURLINGTON**, city and co. seat of Des Moines co., Iowa, on the right bank of the Mississippi river and on the Burlington, Cedar Rapids, and Northern, the Burlington Route, and the Toledo, Peoria, and Western railroads; 82 m. below Davenport. It was named from the city of Burlington, Vt., by its first settlers. A fur-trading post was established here as early as 1829; the first dwelling houses were erected in 1833; the town was incorporated Apr. 29, 1837, and the city chartered in Feb., 1838. It was the state capital 1837-40. B., sometimes called the "Orchard City," occupies a natural amphitheater, formed by the limestone bluffs that slope back from the river, and on which many of the residences are built, and is regularly laid out. The river here is broad and deep, and is spanned by a railroad bridge. Steamers run to St. Louis, St. Paul, etc., and the commerce is important. The industries are the manufacture of iron, machinery, wagons, wheels, desks, furniture, sawed lumber, etc., pork-packing, and the quarrying of limestone and coal found in the vicinity. There are large stock-yards at East B. There are national and savings-banks, a public library, high school, Y. M. C. A., Masonic and Odd Fellows halls, Burlington Univ., founded 1863, churches, and several newspapers. Pop. '90, 22,566.

**BURLINGTON**, city and port of entry in Burlington co., N. J., on the Delaware river, and the Pennsylvania railroad; 18 miles above Philadelphia. Burlington was settled in 1677, chiefly by Friends, and was first called New Beverly. It was long the seat of government of the colony of West Jersey, and was the residence of the last colonial governor, William Franklin, and for a long time carried on a lucrative trade with the West Indies. In 1776 the town was bombarded by the British. It was incorporated in 1784. The Delaware River is here nearly a mile wide, and contains an island of 300 acres. Bristol lies on the opposite side, and is connected with Burlington by ferry. The city contains some fine old mansions and old St. Mary's Church, which was endowed by Queen Anne. There are churches, a national bank, an opera house, a public library, Burlington College, founded in 1846, St. Mary's Hall (Protestant Episcopal), Van Rensselaer Seminary (Presbyterian), electric lights, and manufactories of shoes, stoves, iron pipe, terra cotta and canned goods. Pop. '90, 7264.

**BURLINGTON**, city, port of entry, and co. seat of Chittenden co., Vt., on Burlington Bay, the eastern shore of Lake Champlain, and the Rutland and the Central Vermont railroads; 40 miles n.w. of Montpelier. Burlington was settled in 1773, but not permanently inhabited until after the Revolution. The town was garrisoned during the War of 1812. In 1809 the second steamboat in America, the *Vermont*, was launched at Burlington. The city was incorporated in 1865. Burlington is beautifully situated on ground rising gradually from the lake to a height of 300 feet, and commands fine views of the Adirondack and Green Mountains. The streets are broad and well shaded, and in the center of the city is a large public square, around which cluster the handsome county court house, the city hall, the United States post-office and custom house, the Young Men's Christian Association building, and the principal hotels. The Roman Catholic Cathedral and St. Paul's Episcopal Church are the finest churches. The University of Vermont (q. v.), founded in 1791, has a commanding position on a hill 375 feet in height, within a park of seven acres. The Billings Library, designed by Richardson, is the most beautiful of the buildings. The view from the university tower is magnificent. The State Agricultural College forms part of the university. The principal libraries are the Fletcher Free Library, the University Library, and the Burlington Law Library. There are an opera house, two art galleries, churches, national and savings banks, a trust company, the Mary Fletcher Hospital, Home for Aged Women, Home for Friendless Women, Home for Destitute Children, Adams Mission House, Louisa Howard Mission, Providence Orphan Asylum, Cancer Relief Association, Lake View Retreat, Nervine and Rest Cure, several sanitariums, and many charitable associations. The educational institutions include a high and several graded schools, St. Joseph's Academy, St. Mary's Academy (both Roman Catholic), and the Vermont Episcopal Institute. Several daily and weekly newspapers are published. Burlington has two cemeteries—Lake View, situated near the lake, and Green Mount, overlooking the Winooski Valley, and containing the grave of Colonel Ethan Allen, with a monument. The Lake Champlain Yacht Club has a fine club-house near the lake. An artificial breakwater forms a safe harbor, and on Juniper Island, opposite the city, is a lighthouse. A bridge crosses the Winooski River to the manufacturing suburb of Winooski, famous for its large woolen mills. Burlington is one of the largest lumber markets in the country. Large quarries of marble, and other building stone in the vicinity furnish material for another important branch of its commerce. The manufactures are numerous and varied. Population, 1880, 11,366; 1890, 14,560.

**BURLINGTON**. See BRIDLINGTON.

**BURLINGTON LIMESTONE**, a valuable material for building, found in abundance near Burlington, Iowa, and elsewhere along the Mississippi, usually in double beds, the upper one nearly all carbonate of lime, the lower one containing magnesia. This stone is peculiar for the abundance of fossils found in it, especially of crinoides and corals.

**BURMAH** is the largest of all the provinces of the Indian empire. It stretches from 28° lat. on the confines of Thibet southward for 1100 m., to 10° lat. far down the Malay

peninsula, and from 108° long., on the Chinese border, for 700 m. westward to the bay of Bengal. It is coterminous with China and Siam on the e.; and for the rest it is bounded by the Indian provinces of Bengal and Assam, and by the ocean. Its total area is about 280,000 sq. m., of which one third belongs to the old province of lower B. and two thirds to the new province of upper B. The country consists of the great basin of the Irrawaddy and its affluents; the rugged country drained by the Salween and Sittang rivers, on the upper waters of which are situated the Shan states; and the narrow maritime provinces of Arakan and Tenasserim. The deltas of the chief rivers are flat plains. The level, cultivable plains probably do not exceed 50,000 sq. m. in all. The rest of B. is hilly, broken country covered with forest for the most part. There are large highland tracts, with a ruling elevation of 2000 to 4000 ft. The principal hill ranges are the Patkoi mountains in the n., which reach at one point to a height of 12,000 ft.; the China hills in the n.e., culminating in perpetual snow-peaks 15,000 ft. high; the Aracan Yoma range, running from Bengal to cape Negrais; the Pegu Yoma range; the Tenasserim range, running from the Salween river to the foot of the Malay peninsula; and lastly, the Shan states, a vast upland, cleft by deep chasms, in which flow the Salween and Cambodia rivers and their feeders. The chief river, the Irrawaddy, has a course of 1100 m. to the bay of Bengal, and is navigable all the year round by river steamers. The Salween, rising, like the former, in the Thibet snows, is navigable for only about 80 m. from the sea. The Sittang rises in the hills s.e. of Mandalay. All are traversed during the rainy season by thousands of native barges and boats. During the dry season only the largest rivers can be navigated.

*Climate.*—On the coast, only two seasons are known—the dry and the rainy, which are regulated by the n.e. and the s.w. monsoons; but in B. proper less rain falls, and there are three seasons—the cold, the hot, and the rainy. Some showers fall in May or June, but the great rains last from the middle of Aug. to the end of Oct. The cool season is from the middle of Oct. till the beginning of Apr., and from this month till the great rains is the hot part of the year, the thermometer ranging from 85° to 100°. The climate is, on the whole, healthy, but the jungles are very pestiferous.

*Minerals.*—B. possesses great mineral resources, but they have not yet been very productive. Throughout the whole of Lower B., where the officers of the geological survey have made a careful investigation, gold is found in small quantities by washing the river sand. Copper, lead, iron and tin are also found, and a considerable amount of petroleum, which is produced in large quantities along the Irrawaddy river and in Arakan. Jade, amber, and ruby mines exist, especially in Upper B., and an excellent quality of white marble is found near Mandalay, and is used in making images of Buddha and in ornamenting pagodas. There are veins of coal in the Shan states, on the Chindwin river and on the Irrawaddy above Mandalay. Some coal is found also in Lower B. There are remarkable ruby mines in a district north of Mandalay covering an area of about 200 sq. m. The mines have been worked in a rude fashion and the larger stones are royal property, but many are hidden and smuggled away. Since 1838 European machinery has been introduced in the working of these mines. Limestone is found in many parts of the country and good building stone abounds near Mandalay and in most of the districts outside the delta.

*Vegetable productions.*—A few only of the most striking of these can be noticed. Of the graceful palm-tribe (*palmaceæ*), the cocoa-nut, the betel, the palmyra, and the nipa, or water-palm, are the most prized. The useful bamboo is widely diffused. The teak, of which B. possesses inexhaustible forests, and the hopea, are amongst the most valuable of the timber-trees. Forests of pine grow to the eastward of Amarapura. The wood-oil tree is found on the higher Salween, one trunk of which will produce from 30 to 40 gallons of oil every season. The staple fruit of the country is the plaintain or banana. The jack is prized by the natives. The mango reaches the height of 100 ft., and produces a delicious fruit. Rice, wheat, tobacco, indigo, and cotton are cultivated.

*Animals.*—The *felidae*, or cat family, abound, tigers, leopards, and tiger-cats being met with in every part of the country. Of the *pachydermata*, the elephant and rhinoceros are the most noteworthy. The elephant, buffalo, and Indian ox have been domesticated.

*Ethnology.*—The Burmans belong to that branch of the Mongolids characterized by a monosyllabic language; they are short-headed, broad-skulled, and flat-faced. The hair is black, and the skin of a deep brown color. Their dress is simple, but peculiar. The *in-gie*, a white linen jacket, is common to both sexes. Wrapped around the lower part of the body, the men wear the *put-so*, which is several yards in length; the women, the *te-mine*, a scant garment of cotton or silk. Silks, muslins, and valuable gold ornaments are worn on special occasions. Betel-nut chewing and cigar-smoking are greatly practiced by both men and women. The Burmans are, generally speaking, fine, well-made men, and excel in wrestling, boxing, rowing, foot-ball, and other athletic exercises; they are clever as carpenters and smiths. Burman houses are made of a framework of bamboo, thatched with the leaf of the water-palm, and are invariably raised on posts several feet from the ground. The women are more industrious than the men; they buy, sell, weave, and attend to the domestic concerns. Both sexes delight in merry-making, feasting, buffoonery, and sight-seeing. A *pooy*, or theatrical representation, is a very favorite amusement, and a buffalo-fight attracts crowds of spectators. The Burman has little patriotism, but is attached to his home. Without individual cruelty, he is indifferent to the shedding of blood by his rulers. Though temperate and hardy, he dislikes disci-

pline and continued employment; and when in power, is too often arrogant, arbitrary, and corrupt.

Besides the true Burmans, a great variety of races inhabit the Burman territories. The most numerous, next to the Burmans, are the Shans, who are scattered over the country, but live chiefly in the highland regions. They resemble the Burmans, but are harder, more courageous, and poorer. The Karens were formerly in a condition of subjection to the Burmans, by whom they were despised and oppressed. They used to be nature-worshippers, but a large number of them have been converted to the Christian faith through the work of the American missionaries. The Kachins dwell in the highland regions of Upper B. They are warlike, and defend themselves with obstinacy against invaders. Among the other hill tribes may be mentioned the Singphos and the Paloungs, the latter being the most savage of the Shan tribes.

*Religion.*—Buddhism (q. v.) is the prevailing religion of B., where it has been preserved in great purity. Its monuments—temples, shrines, and monasteries—are innumerable; its festivals are carefully observed, and its monastic system is fully established in every part of the kingdom. While directing the reader to the special article on BUDDHISM for an account of its doctrines, history, etc., we may here glance at its development, institutions, and edifices among the Burmans. The Burman religion has the peculiar feature that it allows tolerance to other creeds, but permits no proselytism. At an early age every boy enters the temple or pagoda, and after learning to read and write becomes a monk, but is not required to remain. The temples, which are voluntarily supported, are very numerous.

The members of the monastic fraternity are known in B. as *pon-gyees*, meaning "great glory;" but the Pali word is *rahan*, or holy man. The *pon-gyees* are not priests, in the usual acceptance of the term, but rather monks. Their religious ministrations are confined to sermons, and they do not interfere with the worship of the people. They are a very numerous class, living in monasteries, or *kyoungs*, and may at once be known by their yellow robes (the color of mourning), shaven heads, and bare feet. They subsist wholly by the charity of the people, which, however, they well repay by instructing the boys of the country. The *kyoungs* are thus converted into national schools. The vows of a *pon-gyee* include celibacy, poverty, and the renunciation of the world; but from these he may at any time be released, and return to a secular life. Hence, nearly every youth assumes the yellow robe for a time, as a meritorious act, or for the purpose of study, and the ceremony of making a *pon-gyee* is one of great importance. The ostensible object of the brotherhood is the more perfect observance of the laws of Buddha. The order is composed of five classes—viz., young men who wear the yellow robe and live in the *kyoungs*, but are not professed members; those on whom the title and character of *pon-gyees* have been solemnly conferred with the usual ceremonies; the heads or governors of the several communities; provincials, whose jurisdiction extends over their respective provinces; and, lastly, a superior general, or great master, who directs the affairs of the order throughout the empire.

In B., the last Buddha is worshiped under the name of Gautama. His images crowd the temples, and many are of a gigantic size. The days of worship are at the new and full moon, and seven days after each; but the whole time, from the full moon of July, to the full moon of Oct., is devoted by the Burmans to a stricter observance of the ceremonies of their religion. During the latter month, several religious festivals take place, which are so many social gatherings and occasions for grand displays of dress, dancing, music, and feasting. At such times, barges full of gayly-dressed people, the women dancing to the monotonous dissonance of a Burman band, may be seen gliding along the rivers to some shrine of peculiar sanctity. The worship on these occasions has been described by an eye-witness, in 1857, as follows: "Arrived at the shrines and temples, the people suddenly turn from pleasure to devotion. Men bearing ornamental paper-umbrellas, fruits, flowers, and other offerings, crowd the image-houses, present their gifts to the favorite idol, make their *shék-ho*, and say their prayers with all dispatch. Others are gluing more gold-leaf on the face of the image, or saluting him with crackers, the explosion of which in nowise interferes with the serenity of the worshippers. The women for the most part remain outside, kneeling on the sward, just at the entrance of the temple, where a view can be obtained of the image within." On another occasion, we read: "The principal temple being under repair, was much crowded by bamboo scaffolding, and new pillars were being put up, each bearing an inscription with the name of the donor. . . . The umbrellas brought as offerings were so numerous, that one could with difficulty thread a passage through them. Some were pure white, others white and gold, while many boasted all the colors of the rainbow. They were made of paper, beautifully cut into various patterns. There were numerous altars and images, and numberless little Gautamas; but a deep niche or cave, at the far end of which was a fat idol, with a yellow cloth wrapped round him, seemed a place of peculiar sanctity. This recess would have been quite dark, had it not been for the numberless tapers of yellow wax that were burning before the image. The closeness of the place, the smoke from the candles, and the fumes from the quantity of crackers constantly being let off, rendered respiration almost impossible. An old *pon-gyee*, however, the only one I ever saw in a temple, seemed quite in his element; his shaven bristly head and coarse features looking ugly enough to serve for some favorite idol, and he seemed a fitting embodiment of so senseless and degrading a worship. Offerings of flowers, paper-ornaments, flags, and candles were scattered about in profusion. The beating a bell with a deer's horn, the explosion of crackers, and the rapid mutter

ing of prayers, made up a din of sounds, the suitable accompaniment of so misdirected a devotion."

The roary is in general use, and the Pali words *aneitya* / *doka* / *anatta* / expressing the transitory nature of all sublunary things, are very often repeated. The Burman is singularly free from fanaticism in the exercise of his religion, and his most sacred temples may be freely entered by the stranger without offense; indeed, the impartial observer will hardly fail to admit that Buddhism, in the absence of a purer creed, possesses considerable influence for good in the country under consideration. The Karens, who used to be nature-worshippers, have many of them embraced Christianity at the teaching of American Baptist missionaries, and now there are over 500 parishes of Christian Karens, containing nearly 200,000 souls; each parish supports its own church, pastor, school, and schoolmaster.

The sacred edifices of the Buddhists are: 1. The *tope*, *dagoba*, or *shrine* (*sades* or *tea-dee*), a monument erected to the last Buddha, is a solid, bell-shaped mass of plastered brick-work, tapering to the summit, which is crowned by the *tee*, or umbrella, of open ironwork. 2. The *temple*, in which are many images of Gautama. The most remarkable specimen of Burman temple-architecture is the *ananda* of Pagan. The ground plan takes the form of a perfect Greek cross, and a tapering spire, with a gilded *tee* at the height of 168 ft. from the foundation, crowns the whole. 3. The *kyoung* or monastery (*vihara*) is generally constructed with a roof of several diminishing stages, and is often elaborately adorned. Burman architecture "differs essentially from that of India in the frequent use of the pointed arch, not only for doors and windows, but also in the vaulted coverings of passages."

*Cities*.—Mandalay, the capital of upper B., and former seat of royalty, is situated 8 m. from the Irrawaddy, a little to the n. of Amarapura and Ava. It is laid out in three parallelograms, one within another, of which the inner two are walled; the palace occupies the center. Ava and Amarapura, each at one time the capital of the empire, are now almost entirely deserted. Pagan represents the past of B., and is remarkable for its magnificent ruins of temple-architecture, extending over 8 sq.m.; the prevailing type is the cruciform vaulted temple.

*Government*.—The government of B. was a pure despotism, life and property being at the mercy of the reigning sovereign. The *lot-dau*, or high court of council, was composed of the four *woon-gyees*, or principal ministers of state. The *Dam-a-thal*, a Burman translation of the *Institutes of Manu*, was also in force. White umbrellas and white elephants were regarded as insignia of royalty. The "lord white elephant," indeed, was looked on as an estate of the realm, a mark of sovereignty, and a sacred being.

B. is now governed, in behalf of the viceroy of India, by a chief commissioner, whose headquarters are mainly at Rangoon. The territory is divided into eight provinces, over each of which a commissioner is the supreme judicial and executive officer; and each commissionership is again divided into districts. Each district contains five to ten townships (*myos*), over which presides a Burman magistrate. Beneath the township officer are the circle officers (*thugyas*). Each village has its headman, vested with petty police and revenue powers. The district administration is supported by a strong police force, partly Burmans and partly Indians, commanded by European officers. A military garrison, consisting of about 20,000 troops, occupies the country (1888).

*Language*.—The vernacular tongue of B. belongs to the monosyllabic class of languages, is without inflection, and is written from left to right. Letters are formed of circles and segments of circles, and are perhaps the modification of Sanskrit characters. The grammar is simple, but the language is difficult to acquire on account of its peculiar pronunciation. Burmese has been a written language for perhaps 800 years, and the Shan language (akin to Burmese) has also been long written. Karen has been reduced to writing by the American missionaries. The classical and religious language is Pali, the older literature of the country consisting of Pali works on law and religion. There are books on history, but they are not trustworthy. The favorite literature consists of dramas and poetical fables. Printed books are now sold in nearly every market in Lower B., and several vernacular newspapers are published. A grammar and dictionary have been published by A. Judson in 1836 and 1877 respectively.

*Education*.—The primary schools are the Buddhist monasteries, in which every boy must spend a part of his life and learn to read and write. Girls are often taught with the boys in lay schools, and schools for girls alone have been established. In general, in the treatment of women B. compares very favorably with other Oriental countries.

*Trade, etc.*—The external seaborne trade of lower B. is valued at fourteen millions sterling. The chief export items are rice, teak timber, cutch, hides, cotton; the chief import items are cotton piece-goods and yarns, silk goods, coal, hardware, salt, and metals. The great staple of Lower B. is rice, of which as much as 1,150,000 tons are exported in one year. Since B. came under British rule, many m. of metaled and bridged roads have been made; three navigable canals have been dug; three railways have been opened, one connecting Mandalay with the seaboard; embankments have been erected along the Irrawaddy, and hospitals, court-houses, and churches in many places. The Irrawaddy flotilla company have placed on the Irrawaddy a fleet of large steamers and flats, and the peace of the country is safeguarded by forts at Rangoon, Thayetmyo, Mandalay, etc., as well as by batteries at the ports of Rangoon and Moulmein.

*Railways*.—The extent of railway lines has greatly increased in recent years. In Dec., 1896, work was begun on the Mandalay-Salween line. The country has been surveyed by British engineers, and in July, 1896, the Rothschilds announced the formation of the Burmah Railways Company, with a capital of £2,000,000. This company acquired

several lines already open to traffic, among them the line from Rangoon to Prome (161 miles), from Rangoon to Tounghoo (166), and from Tounghoo to Mandalay (220). In all, the state railway system acquired by the syndicate had 1,000 miles open to traffic. Several important lines are in process of construction. The government guarantees an interest of 24 per cent., and participation in the surplus profits.

**Arts and Manufactures.**—The native artisans display great skill and taste in wood-carving, lacquer ware, made on delicately woven bamboo frames, silver repoussé work, and woven silk fabrics. They also make serviceable and picturesque boats, forming the lower part of the hull from the trunk of the thingan-tree. The prow and the stern, which are raised several feet above the deck, are often beautifully or grotesquely ornamented.

**Architecture.**—The people live in wooden houses or bamboo huts, which are built on posts or piles, and are sometimes twelve feet from the ground. This is true of the upland as well as of the marshy districts. In the cities a few houses of masonry are to be seen. The well-to-do build their houses of teak or other wood planks, the high pitched roofs and projecting eaves presenting a very picturesque appearance. Devout Burmans erect monasteries and rest-houses in the cities and villages, expecting to obtain in return reward in the future life. The large cities contain beautiful pagodas and monasteries, and Mandalay is famed for its monasteries. The most sacred pagoda is at Rangoon.

**Finances, etc.**—The total public revenue for the year ending March 31, 1896, was 5,575,823 rupees.

**History.**—Of the early and mythical history of B., nothing need here be said. The kingdoms of Ava and Pegu long contended for mastery. The latter was in its zenith in about 1680 A.D. Passing on to 1752, it appears the Paguans, after a period of subjection, obtained the advantage. At this time, however, Alompra, or *Aloung-Pra*, the most celebrated warrior-king in Burman history, rose to power, founded the present dynasty, subdued the Peguans, and incorporated their country, as well as many neighboring states with his own. During the later part of the 18th century Siam revolted, and B. suffered three invasions by Chinese armies from the n. Early in the 19th century the Burmese conquered Assam, and about 1820 came into contact with the British power in India, making incursions into British territory, attacking British subjects and troops, and refusing demands for redress. War ensued, 1824-26, ending in the cession by Ava of the provinces of Arakan and Tenasserim. After 1830 war broke out again, and ended in the acquisition of Pegu by the British. From 1880-85 the Mandalay government intrigued with another European power, and infringed the existing treaty. King Thebaw's repeated attacks on the interests of British subjects led to an ultimatum from the Indian viceroy. On Thebaw's refusal to treat, and the publication of a proclamation calling all Burmans to rise against the English, a British force invaded his kingdom, captured Mandalay and carried Thebaw off captive to India. Early in 1886 the whole of upper B. was incorporated with the queen's Indian dominions. On January 15, 1896, an agreement was concluded between France and Great Britain making the Mekong river the boundary between the Shan States and Indo-China. This arrangement gave up to France a part of the territory on the eastern side of the Upper Mekong, which was formerly tributary to B. In the same year a plan for the formation of a local legislative council for B. was under discussion. In 1891, the population was 7,605,660, of whom 4,658,627 were in Upper B. See Yule's *Narrative of the Mission in 1856*; Fytche's *Burma Past and Present* (1878); Winter's *Six Months in B.* (1858); Capt. Bower's *Bhamo Expedition* (1869); Vincent's *Land of the White Elephant* (1874); Colquhoun's *Across Chryse* (1883). For types of people, see illus., *ETHNOLOGY*, vol. V.

**BURMANN, PETER**, the most important member of a Dutch family celebrated for learning, was b. at Utrecht 1668, studied law at the university of that city and of Leyden, and, after taking his degree in 1688, traveled through Germany and Switzerland. After practicing as an advocate for some years, he was appointed professor of history and rhetoric in the university of Utrecht; which office he subsequently exchanged for the professorship of Greek. In 1715, after the death of Perizonius, he removed to the university of Leyden, where he died 31 Mar., 1741.

His literary career was very active, and his hot temper and intolerant spirit involved him in many controversies. Among his most distinguished adversaries were Le Clerc and Bentley. His chief works are editions of the Latin classics—Petronius, Velleius Paterculus, Quintilian, Valerius Flaccus, Phædrus, Ovid, the *Poëtæ Minores*, Suetonius, Lucan. The first of these appeared in 1709, and the last in 1740. They are characterized less by taste and critical acumen than by learning, fullness, and beauty of type.

**BUR-MARIGOLD** (*Bidens*), a widely distributed genus of composite annuals and perennials, including in America the weeds called "beggar-ticks." Some species have very showy flowers.

**BURMEISTER, HERMANN**, b. 1807; a Prussian naturalist, studied medicine and natural history, and in 1842 was appointed professor of zoology in the university of Halle. In 1848 he was a deputy to the Frankfort assembly, and afterwards a representative in the first Prussian chamber. In 1860, he made a survey in Brazil in the interest of science, and visited other parts of South America a few years later. He published many elaborate works on natural history, travels, etc. He d. in 1892.

**BURMESE WARE**, small cups, etc., made of strips of bamboo woven like fine basket work, the interstices being filled with paste made of wood-oil and fine powders, and when sufficiently hardened the surface smoothed with pumice-stone and water.



**BURN, RICHARD**, was b. in 1720 at the village of Winton, in Westmoreland. After being educated at Queen's college, Oxford, he received the living of Orton, in his native county, which he continued to hold until his death in 1785. He is widely known as the compiler of two very useful law-books, the *Justice of the Peace and Ecclesiastical Law*, which have each passed through many editions. He also published a *History of the Poor Laws*, an edition of Blackstone's *Commentaries*, and several sermons and works of a religious nature.

**BURN, WILLIAM**, Scottish architect, 1769-1870; was born in Edinburgh, and trained under Smirke; founded a successful business in Edinburgh, and removed to London (1844), where he was equally popular and well employed, and where he died. His "restoration" of St. Giles' church (1829-33), in Edinburgh, was singularly devoid of taste or reverence, and has been as far as possible undone.

**BURNABY, FREDERICK GUSTAVUS**, 1842-85; b. Bedford, Eng.; educated at Harrow and in Germany. Early in life he displayed his fondness for hardships and adventure. He entered the royal horse guards in 1859; traveled extensively; and in 1875, undertook his famous ride to Khiva. In this exploit, unaided and alone, he made his way to the heart of Asia, notwithstanding the oriental laws forbidding the passage of foreigners into certain districts, and the traps laid by the Russians to waylay him. In 1876-77, he rode on horseback through Asia Minor, and from Scutari to Khiva, in Persia. He was military correspondent of the *Times*, with Don Carlos in Spain; and in 1880, contested Birmingham for parliament as a conservative, receiving 15,716 votes, although Joseph Chamberlain and John Bright were the opposing candidates. He took part in the Egyptian campaigns, and was killed in an engagement with El Mahdi's troops, Jan., 1885. His death was widely lamented in England. An interesting account of B.'s travels is in his two books, *A Ride to Khiva*, and *On Horseback through Asia Minor*.

**BURNAND, FRANCIS COWLEY**, b. 1837; educated at Eton and Cambridge, and called to the bar in 1862. His success as a writer of burlesques led him to adopt literature as a profession. He has produced nearly a hundred dramatic pieces, among which *Ixion*, and the travesty of Jerrold's *Black-Eyed Susan*, had remarkable runs. He became one of the leading contributors to *Punch*, and in 1880 succeeded Tom Taylor as its editor. From the pages of that periodical he has collected a number of volumes, among which the best known are *Happy Thoughts* (1870), *More Happy Thoughts* (1871), *Happy Thought Hall* (1872), *Quits at Home* (1890).

**BURNAP, GEORGE WASHINGTON**, D.D., 1802-1859; a graduate of Harvard, and pastor of the First Independent church of Baltimore from 1828 until his death. He was the author of many volumes on religious themes, lectures, a life of Calvert, governor of Maryland, an exposition of his particular school of Unitarianism (1855), etc.

**BURNE-JONES, Sir EDWARD, A.R.A.**, English artist, was b. at Birmingham, of Welsh descent, Aug. 28, 1833. He was educated at King Edward's grammar school, and at Exeter college, Oxford, which he entered in 1853, and was destined for the church, but having decided to adopt art as a profession, left the university without taking any degree. He however received the honorary degree of D.C.L. from Oxford in 1881, and was given an honorary fellowship by Exeter college. In 1856 he went to London to begin his art study, but instead of entering an academy taught himself, receiving much help from Rossetti, and allied himself with the romantic school (see PRE-RAPHAELITES), in which his friend was prominent. Among his early works may be mentioned the triptych in oil-color, of the "Annunciation and Nativity," in St. Paul's, Brighton, 1861; "The Merciful Knight," 1864; "The Wine of Circe," 1867; and "Love among the Ruins," 1873, all three in water (body) color. After 1870, his principal pictures were executed in oils, and among them are "Laus Veneris," 1873-75; "The Beguiling of Merlin," 1877; "Le Chant d'Amour," 1878; "The Golden Stairs," 1880; "King Cophetua," 1884; "The Depths of the Sea," 1886; "The Brazen Tower," 1888; "The Legend of the Briar Rose," 1890. In 1865 he was elected an associate of the Royal Academy of Arts; and in 1887 he aided in establishing the New Gallery of Art. The work of Burne-Jones includes some fine designs for stained glass, such as those for the St. Cecilia window of Christ church, Oxford; and the mosaic in the apse of the American church at Rome was designed by him. His early paintings, though often deficient in draughtsmanship, were very brilliant in color; his later pictures, though no less poetical, show a greater knowledge of the human figure, but are lower in tone. He was made a baronet in 1895.

**BURNES, Sir ALEXANDER**, a distinguished traveler in Central Asia, was b. at Montrose, in Scotland, 1805, where his father, who was a cousin of Robert Burns the poet, was an active magistrate. He early entered the Indian army, and his knowledge of oriental languages gained him rapid promotion. After performing some important missions for the Indian government, he was, at his own suggestion, sent on an expedition into Central Asia. Starting from Lahore on the 11th Feb., 1832, B., having adopted the dress and usage of the Afghans for greater safety, passed through Peshawur and Cabul, and, crossing the Indian Caucasus, reached Balkh on the 9th June. Thence he passed on to Bokhara, Astrabad, and Teheran, and journeying through Ispahan and Shiraz, reached Bushire on the Persian gulf, from whence he embarked for India. He received the special thanks of the governor-general for his travels; and on his return to England in 1838, he received a warm welcome from the India house and board of con-

trol, and was highly honored by the Royal Geographical and other societies. In Sept., 1839, having previously, for his important services, been knighted and promoted to the rank of lieut.col., he was appointed political resident at Cabul, where he was murdered on the breaking out of the insurrection in that city in Nov., 1841—a tragedy re-enacted in 1879, when sir Louis Cavagnari, newly appointed resident in Cabul, was massacred, with his staff and guards. B. was author of *Travels into Bokhara* and a work on *Cabul*.

**BURNET**, the English name of two genera of plants, *sanguisorba* and *poterium*, belonging to the natural order *sanguisorbeae* (q.v.)—very generally regarded as a suborder of *rosacea*—which have much resemblance to one another, and receive a common name also in other languages. *Sanguisorba* has hermaphrodite flowers with four stamens; in *poterium*, the flowers are polygamous, and the stamens indefinite in number. In both, the calyx is 4-fid, and the corolla wanting. **GREAT B.** (*sanguisorba officinalis*) is common in meadows in all parts of Europe, and not unfrequent in some parts of England, particularly where the soil is calcareous. It has a stem 1 to 2 ft. high, pinnate leaves, with about four pair of ovate serrated leaflets and an odd one; the flowers are crowded in dark red spikes. It is cultivated in Germany for feeding cattle, and is much esteemed for this use, as it grows well even on very poor soils, and the produce is abundant. Cattle are very fond of it. The root is astringent, and was formerly used in medicine. **COMMON B.** (*poterium sanguisorba*) grows in sunny places on hills in the middle and south of Europe, and is common in England, especially in the chalk districts. In habit and foliage, it much resembles the Great B., but the leaflets are smaller and the flowers are in heads of a dull purplish color. It has been much cultivated in some parts of England as a substitute for clover on chalky soils, and is relished by cattle. It forms great part of the natural pasture of the South Downs, and of the excellent sheep-walks of Salisbury plain. It is regarded as a plant particularly suitable for poor arid soils. It is sometimes cultivated in gardens, and its leaves, which are slightly astringent, are used in salads or soups. They are said to form one of the ingredients of the famous *cool tankard*, and the name *poterium* is from Greek word signifying a drinking vessel.—Both this and the preceding are perennial plants.—There are several other species both of *sanguisorba* and *poterium*, some of the latter shrubby, natives chiefly of the warmer temperate parts of the world. *P. Canadense* is found in the north-eastern U. S.

**BURNET**, a co. in central Texas, on the Colorado river; 1000 sq.m.; pop. '70, 8688—858 colored; in '90, 10,721. The surface is hilly and rocky, with fertile soil. Marble of various colors, limestone, coal, iron, and petroleum are found. Agriculture is the main business. Co. seat, Burnet.

**BURNET, GILBERT**, bishop of Salisbury, was b. at Edinburgh, on the 18th Sept., 1648. He was educated at home, and afterwards at Marischal college, Aberdeen, where he pursued his studies so diligently, that he took his degree of M.A. before he was 14. In the course of a year he made up his mind to enter the church, and read so hard at theology, that in less than three years he had mastered the chief systems of divinity, besides having gone over the Old and New Testaments in the original, with all the commentaries of note in his time. In 1668, he visited Cambridge, Oxford, and London, where he met with many of the leading divines of England. Next year, he passed over into Holland and perfected his knowledge of Hebrew under a learned rabbin of Amsterdam. In 1665, he was presented to the parish of Saltoun, where he remained five years. In 1669, he was appointed professor of divinity in the university of Glasgow, but having mixed himself up in the politico-ecclesiastical affairs of the time, he brought upon himself the enmity of Lauderdale, and found it prudent to resign his chair in 1674. He now removed to London, and was made preacher at the Rolls' Chapel by sir Harbottle Grimston, and afterwards lecturer at St. Clement's. In 1676, he published his *Memoirs of the Dukes of Hamilton*, and in 1679, the first volume of his *History of the Reformation*, which procured him a vote of thanks from both houses of parliament. Next year appeared *Some Passages in the Life and Death of the Earl of Rochester*, in which B. records the religious interviews which he had with that profligate nobleman during his last illness, and which led to the latter's conviction of the truth of Christianity. In 1681, he published the second volume of his *History of the Reformation*, and in 1682 his *Life of Sir Matthew Hale*. The efforts which had previously been made, were now repeated, to induce him to break with the liberal and moderate party, and to attach himself to the king. He was offered the bishopric of Chichester, but refused it. In 1688 he narrowly escaped being brought into trouble in regard to the Ryehouse plot. He conducted the defense, attended the execution, and vindicated the memory of his friend lord William Russell. The king exhibited his unkingly spite by depriving B. of his St. Clement's lectureship. On the accession of James II., he went to the continent, and traveled through France, Italy, Switzerland, and Germany. In 1684, he was introduced to the prince of Orange, with whom he became a great favorite, and by whom he was frequently consulted in reference to the great scheme for the deliverance of England. When William came over, B. accompanied him in the capacity of royal chaplain, and shortly after, was appointed bishop of Salisbury. He entered on the duties of his diocese with great ardor; but his first pastoral letter, in which he founded the right of William to the throne on conquest, gave so much offense to both houses of parliament, that they ordered it to be burned by the hands of the common hangman. William, however, who

knew the excellent qualities of the bishop, was not greatly impressed by this solemn performance, and continued to trust B. to the end of his life. In 1696, B. was appointed preceptor to the duke of Gloucester; in 1699, he published his celebrated exposition of the 39 articles, which was condemned as heterodox by that not very competent assembly, the house of lords. In 1714, appeared the third volume of his *History of the Reformation*. In the spring of 1715, he was attacked by a pleuritic fever, and carried off on the 17th of Mar., in the 72d year of his age. B. was thrice married: his first wife was remarkable for her beauty; the second, for her fortune; and the third, for her piety.

Soon after B.'s death, appeared *Bishop B.'s History of his Own Time, from the Restoration of King Charles II. to the Conclusion of the Treaty of Peace at Utrecht, in the Reign of Queen Anne*. It was sarcastically but foolishly abused by the tory writers of the day—Swift, Pope, Arbuthnot, and others. B. was a man of strict, almost of puritanic virtue; yet his charity, geniality, and moderation of sentiment might be imitated with advantage even in our own day. His style is neither elegant nor correct, and his judgment is not always reliable, yet the honesty, earnestness, simplicity, and vigor of his writings, as well as their fullness of details, make his works very valuable to the student of history.

**BURNET, JACOB, LL.D.**, 1770–1853; a graduate of Princeton, and one of the early settlers of Cincinnati; judge of the Ohio supreme court in 1821, and U. S. senator in 1828. He published *Notes on the Early Settlement of the North-west Territory*.

**BURNET, JOHN**, a painter, engraver, and author, was b. at Fisherrow, near Edinburgh, Mar., 1784. He was first brought under the notice of the public through his engravings of Wilkie's works, which he executed in a most admirable manner. Of his own paintings, the best known engraving is that of "Greenwich Pensioners receiving News of the Battle of Trafalgar." He has written several works on art, illustrated by drawings and engravings of his own, the most important of which is a *Practical Treatise on Painting*. He is also the author of *Rembrandt and his Works*, 4to, 1849; and in conjunction with Mr. Peter Cunningham, of *Life and Works of J. M. W. Turner*, 1852. He died in 1863.

**BURNET, THOMAS**, best known from his *Theory of the Earth*, was b. in Yorkshire, 1635, and studied at Cambridge. After acting as traveling tutor to several noblemen, he was elected master of the charter-house (1685), and later, succeeded archbishop Tillotson as clerk of the closet to William III. But having (1692) published a work, *Archæologia Philosophica, sive Doctrina Antiqua de Rerum Originibus* (also in English), displaying great learning, but treating the Mosaic account of the fall as an allegory, he was obliged to retire from the clerkship, and lived in the charter-house till his death, in 1715. His *Telluris Theoria Sacra* (first part, 1680; second, 1689) was written in Latin, but translated, or rather recomposed in English, by the author. It is an ingenious speculation, written in ignorance of the facts of the earth's structure, and is therefore a mere system of *cosmogony*, and not *geology*. But it abounds in sublime and poetical conceptions and descriptions, conveyed in language of extraordinary eloquence.

**BURNETT, FRANCES ELIZA HODGSON**, b. Manchester, Eng., 1849, Nov. 24. When she was fifteen years old her parents emigrated to the U. S., and settled in Knoxville, Tenn. At an early age she began her contributions to periodicals, but the short story of *Surly Tim's Troubles*, which appeared in *Scribner's Magazine*, 1873, was the first work from her pen giving evidence of her remarkable abilities. The good impression made by this and succeeding stories and sketches was increased by the powerful novel, *That Lass o' Lowrie's*, which, after running as a serial through *Scribner's Magazine*, was published in book form, 1876. The story was dramatized both in America and in England. She has since published, *Haworth's*, 1878; *Louisiana*, 1880; *A Fair Barbarian*, 1881; *Through One Administration*, 1882; *Picino and other Child Stories*, 1894; *Two Little Pilgrims' Progress*, 1895; *A Lady of Quality*, 1896, etc. In conjunction with W. H. Gillette she produced a play *Esmeralda*, 1881, founded on one of her short stories. In 1873 she married Dr. S. M. Burnett and became a resident of Washington, D. C. *Little Lord Fauntleroy*, 1886, a child's story, was dramatized in 1888, and had long runs on the stage.

**BURNETT, WALDO IRVING**, 1828–54; a naturalist and microscopist; b. Mass. He did a great amount of microscopical work within the five years preceding his death. His chief publication was a prize essay on *The Cell, its Physiology, Pathology, and Philosophy, deduced from Original Observations; to which is added its History and Criticism*.

**BURNETT PRIZES**, THE, two theological premiums, founded by Mr. Burnett of Dens, Aberdeenshire. This gentleman (b. 1729—d. 1784) was a general merchant in Aberdeen, and for many years during his lifetime spent £300 annually on the poor. On his death, he bequeathed the fortune he had made to found the above prizes, as well as for the establishment of funds to relieve poor persons and pauper lunatics, and to support a jail chaplain, in Aberdeen. He directed the prize fund to be accumulated for 40 years at a time, and the prizes (not less than £1200 and £400) to be awarded to the authors of the two best treatises on "The evidence that there is a Being all-powerful, wise, and good, by whom everything exists; and particularly to obviate difficulties regarding the wisdom and goodness of the Deity; and this independent of written revelation, and of the revelation of the Lord Jesus; and from the whole to point out the inferences most necessary and useful to mankind." Prizes were awarded in 1815 and in 1855, and the essays were published. The fund was afterwards applied to the foundation of a lectureship.

**BURNETT'S DISINFECTING LIQUID AND ANTISEPTIC FLUID** is a liquid introduced by sir W. Burnett for the purpose of deodorizing the bilge-water of ships, sewerage-water, etc. It is a strong solution (sp. gr. 2) of chloride of zinc, accompanied by a small amount of chloride of iron; and when intended to be used, it is mixed with water in the proportion of one pint to five gallons of water. The liquid acts only as a *deodorizer* and *antiseptic* (see **ANTISEPTICS**), and does not yield any vapor which can exhibit the properties of a disinfectant (q.v.). It is of service in preserving dead animal tissues, as in the dissecting-room, and in jars containing anatomical specimens. It has little action on knives or steel instruments. When added to bilge or sewerage water, the chloride of zinc,  $ZnCl$ , mainly acts by decomposing the offensive sulphide of ammonium,  $NH_4S$ , which it does by forming the sulphide of zinc,  $ZnS$ , and chloride of ammonium,  $NH_4Cl$ , both of which are odorless. The strong solution of chloride of zinc has also been applied to the preservation of timber, and the process of so treating wood is called, after its inventor, *Burnettizing*. *Crowe's* disinfectant liquid is chemically the same as the above.

**BURNEY**, Dr. CHARLES, a musical composer, celebrated as the author of the *General History of Music*, was b. at Shrewsbury, 1726. Having studied music in his native city, in Chester, and under Dr. Arne in London, he commenced giving lessons in music himself. After composing three pieces—*Robin Hood*, *Alfred*, and *Queen Mab*—for Drury Lane, B. London, and settled at Lynn, in Norfolk, where he designed his work on the *History of Music*. In 1770-72, he traveled in France, Italy, the Netherlands, and Germany, collecting materials for his proposed work, and published an essay on the *Present State of Music in France and Italy*, etc. (2 vols., Lond. 1772). This was followed by his *General History of Music from the Earliest Ages to the Present Period* (4 vols., Lond. 1776-89.) Besides other minor works, B. wrote a *Life of Handel*, and nearly all the musical articles in *Rees's Cyclopædia*. He was appointed organist to the hospital at Chelsea in 1789. He died in 1814. He was intimately acquainted with many of the most eminent men of the day, including Edmund Burke and Dr. Johnstone.—His second daughter, FRANCES B. (afterwards Madame D'Arblay) (q.v.), was distinguished as an authoress.

**BURNHAM BEECHES**, the remains of an ancient forest in Buckinghamshire, England, twenty-five miles northeast of London, noted for its immense beech-trees. The poet Gray, early in the eighteenth century, called attention in his letters to this wild and picturesque tract. In 1879 the London corporation purchased the surrounding 374 acres, and in 1883 set them apart for public use. See Heath, *Burnham Beeches* (1890).

**BURNING GLASSES AND MIRRORS.** See HEAT, LENS, and MIRROR.

**BURNLEY**, a thriving t. and parliamentary borough in Lancashire, situated in a narrow vale on the banks of the Brun, a mile and a half above its junction with the North Calder, and 24 m. n. of Manchester. Pop. of parliamentary borough, est. '96, 102,805. It has factories for the weaving, spinning and printing of cotton, and for the manufacture of weaving machinery. There are collieries in the vicinity, and traffic is facilitated by railways and canals, which unite it with the principal centers of trade in Lancashire and Yorkshire. B. returns one member to parliament.

**BURNOUF**, EMILÉ LOUIS, orientalist, and cousin of Eugène, mentioned below, was born at Valognes, France, Aug. 25, 1821. He lectured for a time at Nancy, on ancient literature, and subsequently was director of the French school at Athens. Among his works are *Méthode pour étudier la Langue Sanscrit* (3d ed., 1885); *Essai sur le Veda* (1868); *Dictionnaire Classique Sanscrit-Français* (1863-65); *Histoire de la Littérature Grecque* (1869); *La Ville et l'Acropole d'Athènes aux diverses Époques* (1877); *La Mythologie des Japonais* (1878); and *Le Catholicisme Contemporain* (1879).

**BURNOUF**, EUGÈNE, one of the most distinguished orientalists of modern times, was b. at Paris, April 1, 1801, and after entering on the study of law, betook himself to the oriental languages, especially those of India and Persia. In conjunction with prof. Lassen of Bonn, he published, in 1826, *Essai sur le Pâli*, which was followed, in 1827, by *Observations Grammaticales sur quelques Passages de l'Essai sur le Pâli*. His great aim, however, at this time, was to obtain a complete knowledge of the remains of the religious literature in the Zend, or old Persic language, which had been neglected since the time of Anquetil du Perron, or, at least, not philologically and critically examined. B. undertook to decipher those curious MSS. which Anquetil du Perron had brought home with him, and which lay unregarded in the *Bibliothèque Impériale*. He commenced by causing the *chef-d'œuvre* of old Persic literature, the *Vendidad-Sadé* (one of the books of Zoroaster), to be lithographed with great care, and published from time to time in the *Journal Asiatique* the brilliant results of his laborious studies, which drew upon him the regard of the learned world. In 1834, he published the first volume of his *Commentaires sur le Yagna, l'un des Livres Liturgiques des Perses*, a work which, for the first time, rendered possible a knowledge not only of the dogmas, but also of the language of Zoroaster. It is a masterpiece of conscientious industry, united with copious lingual and antiquarian lore. His studies in the Zend language induced him to make an attempt to decipher the cuneiform inscriptions of Persepolis, in his *Mémoire sur deux Inscriptions Cunéiformes* (Par. 1836). In 1840, he published the text along with a translation of the *Bhâgavat-Purâna*, a system of Indian mythology and tradition. As the fruit of his study of the Sanscrit books of the Buddhists, appeared in 1845 the *Introduction à l'Histoire du Bouddhisme*. See BUDDHISM.

This great work absorbed for six years the whole energies of B., who was now the recognized successor of Silvestre de Sacy. It is to be regretted that death did not permit him to continue his labors further. He died May 28, 1852.

**BURNOUF, JEAN LOUIS, 1775-1844;** French philologist and father of Eugène, was born at Urville; became professor of rhetoric at the Collège de France in 1817, and subsequently was inspector of the university, general director of studies, and librarian. In 1836 he was elected a director of the Académie des Inscriptions. He was the author of Greek and Latin grammars, and of an excellent translation of Tacitus.

**BURNS, FRANCIS, D.D., 1809-63;** b. in New York; a colored preacher who became a bishop of the Methodist Episcopal church. In 1834 he was a missionary in Liberia, where, in 1851, he founded the Monrovia academy, and in 1858 became bishop.

**BURNS, Rev. JABEZ, D.D.,** a Baptist minister, and one of the most prolific religious writers of the 19th c., was b. at Oldham, near Manchester, in 1805, and was educated at Chester, and afterwards at Oldham grammar-school. After helping his father as a medical practitioner, and acting as assistant in a drapery establishment, he joined the Methodist New Connection, and removed at the age of 21 to London. In 1828 and 1829, he published his first two works, *The Christian Sketch-book* and *The Spiritual Cabinet*, which gained him much popularity among the religious public. After preaching at Perth, Scotland (1830-35), he returned to London to become minister of a general Baptist congregation in Marylebone. He lectured throughout the United Kingdom on temperance, peace, and other subjects; visited the United States in 1846 and 1872, and received degrees from colleges there. Of his numerous works, *Sketches and Skeletons of Sermons* (15 vols.), and *The Pulpit Cyclopædia* (4 vols., 1846-60), are the most important. He died in 1876.

**BURNS, JAMES DRUMMOND,** a poet, was born in Edinburgh in 1823. He studied at the University of Edinburgh, from which he graduated in 1841, and entered the Free Church College, where he studied theology. In 1845 he entered the Presbyterian ministry. His best-known work is *The Vision of Prophecy* (1854). He also published two volumes of minor verse, including several good hymns. He died at Mentone in 1864.

**BURNS, JOHN, M.D.,** a well-known Scotch surgeon, was born in Glasgow in 1775. In 1815 he was called to the chair of surgery in Glasgow University, which he filled for many years. His most important work is the *Principles of Midwifery* (10th ed., 1843), besides which he also published *Principles of Surgery* (1838), and *Principles of Christian Philosophy* (6th ed., 1846). He died in a shipwreck in 1850.

**BURNS, ROBERT,** the great lyric poet of Scotland, was b. 25th Jan., 1759, in a small cottage near Ayr. His father, then a nursery-gardener, and afterwards the occupant of a small farm, had to struggle all his life with poverty and misfortune, but made every exertion to give his children a good education; and the young poet enjoyed an amount of instruction and miscellaneous reading which, to those unacquainted with the habits of the Scottish peasantry, would seem incompatible with the straitened circumstances and early toil which were his lot. About his 16th year, he began composing verses in the Scottish dialect, which attracted notice in the vicinity, and extended the circle of his acquaintance; and thus he became exposed to temptations which, acting on an extremely sociable and passionate disposition, broke in upon the previous sobriety and correctness of his life. A small farm, on which he had entered with his brother in 1781, proved far from a prosperous undertaking; and being harassed and embittered by other misfortunes—the results of imprudence—he resolved to leave his native land, and go to Jamaica. Partly to procure the means of paying his passage, he published a collection of his poems at Kilmarnock in 1786. The reception these met with was highly favorable, and his genius was recognized in quarters where he had not looked for notice. While preparing to embark, he received a letter encouraging him to go to Edinburgh, and issue a new edition. This was the turning-point of his life. During his stay in the Scottish metropolis, he associated with all that was eminent in letters, rank, and fashion, and his conversational powers excited little less admiration than his poetry. The profits of the publication were considerable, and enabled him to take the farm of Ellisland, near Dumfries, where he settled in 1788, having publicly ratified his marriage with Jean Armour. With his farm he conjoined the office of an exciseman; but after 3 or 4 years, he was obliged to give up farming, and from that time lived in Dumfries, dependent on his salary from the excise, which, at first, only £50, never rose above £70. The striking contrasts in the lot of the rich and the poor with which his residence in Edinburgh had impressed him, made him hail the French revolution with enthusiasm; and some imprudent expressions of his having been reported to the authorities, destroyed his prospects of promotion in the service, and only the interference of an influential friend prevented him from losing his office. Such was then the terror of innovation, and the hatred of everything like liberal opinions, that many of the better classes, who had fêted the poet, now shunned the "Jacobin," as they stigmatized him. Embittered by what he felt to be injustice, he recklessly allowed those habits of dissipation to grow upon him which made the more respectable of all classes look coldly on him; and the remorse thus occasioned in his calmer moments aggravated that tendency to melancholy which the gloom and toil of his early years had probably implanted in his constitution. Broken in health, he died 21st July, 1796.

The poetry of B. is purely the outpouring of the moment—the response of the feelings to the immediate circumstances of life. Its charm and power lie in the justness of the feelings expressed, and in the truthfulness and freshness which it derives direct from life. Seldom have such manliness, tenderness, and passion been united as in the songs of Burns. They formed the first awakening of the spirit of true poetry in Britain after a long slumber. The popularity that B. instantly acquired has continued unabated, not only in his native Scotland, but wherever English is spoken; his poems have also been translated into almost every European tongue. Dr. Currie, of Liverpool, published the first collected edition of his poems and letters, with a life (4 vols., Lond., 1800). Several more complete collections have appeared since, such as that by Allan Cunningham (8 vols., Lond., 1834), and that by Mr. Scott Douglas, and Prof. Nichol (7 vols., Edin., 1877–82). A life of B., by Lockhart, appeared, Edin., 1828. In *The Life and Works of Burns* (Edin., 1851–52, revised ed. 1896), by R. Chambers, the poems are incorporated in the narrative in chronological order. See also the Life, by Principal Shairp, in *English Men of Letters*; *Letters to Clarinda* (1802; 1843); the essay by Carlyle and that by R. Louis Stevenson (*Men and Books*). The best portrait is Nasmyth's (1787).

In 1859, the centenary of B.'s birth was celebrated with great enthusiasm, not only in Scotland, but throughout the English-speaking world; and in 1896 the centenary of his death was celebrated by public meetings in Glasgow and Dumfries.

**BURNSIDE, AMBROSE EVERETT**, b. Ind., 1824; a graduate of West Point, serving in the army until 1853, when he resigned and established in Rhode Island a factory for making a breech-loading rifle of his own invention. In the civil war he served as colonel, and brig. and maj. gen. of volunteers, and was in many important engagements. He resigned at the close of the war, and in 1866 was chosen governor of Rhode Island; was re-elected twice afterwards; in 1875 became U. S. senator. He d. 1881.

**BURNS** and **SCALDS** are injuries to the surface of the living body arising from excessive heat—a scald implying that the heat proceeded from a fluid medium, as boiling water; a burn, from a solid. The injury is much the same in both cases; therefore the directions for the treatment of burns will be applicable also to scalds. These injuries may be divided into three classes: 1. Burns resulting in simple redness of the skin; 2. Burns resulting in vesication or blistering; 3. Burns resulting in sloughing, or death of the part. The first object, after the accident has occurred, is to relieve the suffering; and cold applied either in the form of ice or water seems in most cases to have almost a specific power in allaying pain and checking the advance of inflammation. In other cases, moderate warmth is found more efficacious, and we must be guided mainly by the sensations of the sufferer as to which of these remedies we make use of. In very severe cases, opium or chloroform may be employed. But if the injury the body has received be very serious, the patient complains less of pain than of cold; he shivers, is much depressed, and must be well supplied with stimulants, to prevent his dying from the shock.

The best local application is Pond's extract, which derives its name from the well-known plant *hamamelis Virginica*, better known as witch hazel (q.v.). Blisters may be pricked, and the contained serum allowed to trickle away, but on no account is the raised skin to be removed. The dressings should not be changed oftener than cleanliness requires; and as each portion of the old dressing is removed, it must at once be replaced with fresh, so that as little exposure as possible of the burnt surface may take place. The main principle of treatment is exclusion of the air from the injured part; and so long as this is effected, it matters but little what remedial agent is employed. Great care must be taken in the treatment of a sore resulting from a burn, that the contraction of the scar does not cause distortion of the neighboring parts.

When the clothes catch fire, the person should lie down on the floor, and roll herself, or be rolled, in the rug, table-cover, or anything sufficiently voluminous to stifle the flames; and afterwards the clothes, especially stockings, should be removed with great care, lest the cuticle should separate with them, which would materially increase the sufferings of the patient.

Extensive scalds or burns are very fatal to young children; and it must be remembered that their skin is more susceptible to external impressions, and will suffer from a degree of heat innocuous to an adult. Infants have frequently been scalded to death in too hot baths, or by too hot fomentations. The principles of treatment for burns produced by the contact of chemical agents to the skin, are the same as those for burns by fire.

**BURNTISLAND**, a seaport t. of Fifeshire, on the n. shore of the firth of Forth, about 8 m. n.w. of Edinburgh. It consists of one long street, clean and well kept, with a back street running parallel, and some diverging lanes. B. is an important station of the North British railway, having a steamboat ferry connecting it with Granton, the station on the opposite side of the Forth. It has a commodious harbor, which was greatly improved in 1876, and dock. Its trade consists principally of distilling, oil-refining, and the shipping of coal and iron; and in summer it is considerably resorted to as a convenient watering-place. It unites with Kinghorn, Dysart, and Kirkcaldy to send one member to parliament. Pop. '91, 4692.

**BURNT OFFERING**. See SACRIFICE.

**BURNT SIENNA**, a fine orange-red pigment, transparent and permanent, used both in oil and water-color painting. It is obtained by simply burning the ferruginous

ochreous earth known as Terra di Sienna. Excellent greens are produced by mixing it with Prussian blue. It mixes well with other pigments generally, and dries quickly.

**BURNT STONES**, antique carnelians found in ruins, and seeming to have been acted upon by fire, having a dull appearance externally, but exhibiting a beautiful red color when held up to the light. They are sold at a very high price, particularly if to the natural beauty of the stone is added the merit of fine workmanship. They were once, however, more esteemed than now, and an imitation of them, by burning the upper surface of carnelians with a hot iron, was very fashionable.

**BURNT UMBER**, a pigment of a russet-brown color, is semi-transparent, mixes well with other pigments, and dries quickly. It is obtained by burning umber, an ochreous earth containing manganese, and deriving its name from the place where it was first discovered—Umbria, in Italy.

**BUR OAK**, or **BURR OAK**, *Quercus macrocarpa* (Michx.), a valuable tree for timber, found in the Atlantic and Western States; sometimes called the mossy-cup oak.

**BURROW**, JULIE, German novelist, 1806-68, the author of many popular stories. She described the life of a small town with great vividness and accuracy. Among her novels are *Ein Arzt in einer kleinen Stadt*, and *Aus dem Leben eines Glücklichen*.

**BURR**, AARON, 1716-57; a Connecticut teacher and clergyman; in 1788, pastor of the Presbyterian church in Newark, N. J., and in 1748 second president of the college of New Jersey. He published a Latin grammar, several sermons, and *The Supreme Deity of Our Lord Jesus Christ Maintained*. His wife was a daughter of Jonathan Edwards.

**BURR**, AARON, son of the clergyman Aaron Burr; b. N. J., Feb. 6, 1756; d. N. Y., Sept. 14, 1836. He was left an orphan before the age of three; graduated at Princeton in 1772; in 1775, went into the army as a private; at Arnold's attack on Quebec, acted as aid to Gen. Montgomery, and endeavored to bring off the body of that officer, who fell at his side. He acted as brigade-major to Arnold, and in May, 1776, he became a member of Washington's military family, which he left after a few weeks to become aid to Gen. Putnam. In 1777, he was made lieut.col., and won distinction at Monmouth in command of a brigade. In 1778-79, he was stationed near New York, and was for a short time in command of West Point. He was always opposed to Washington, whose military talents he esteemed very lightly. B. resigned in consequence of ill health in the spring of 1779, and three years later married Mrs. Prevost, the widow of a British officer, was admitted to the bar, and began the practice of law at Albany, N. Y. In 1784, and again in 1798-99, he was elected to the state assembly. In 1788, he was appointed attorney-general of the state, and in 1791 was chosen U. S. senator. He was an early, zealous, and unscrupulous partisan leader among the "republicans" (afterwards "democrats"), and the especial rival of Alexander Hamilton, the prominent leader of the federalists. In the presidential struggle of 1800, John Adams (then president), Thomas Jefferson, Charles C. Pinckney, and B. were the candidates, and the votes for Jefferson and B. were equal—73 for each. As the constitution then provided, the person having the greatest number of electoral votes was to be president, and the next highest was to be vice-president. This equal division devolved upon the house of representatives the settlement of the matter, and there each state had one vote only, a majority of all the states being necessary to elect. After a week of balloting, Jefferson was selected the president, B. being vice-president. He had been favored by Jefferson for that place from the first, but his ambition was higher, and he did his utmost to defeat Jefferson, who was the regular candidate of the party. This course politically ruined B.; he was thereafter trusted by no party, though in 1804 the federalists nominated him for governor of New York, the result being his defeat by Morgan Lewis. These disappointments and defeats, added to the intensely bitter character of the partisan warfare of the time, led to the duel (July 11, 1804) in which Hamilton was killed by Burr. For this act, which was then deemed little less than murder, B. was legally disfranchised in New York, and covered with the heavier curse of popular indignation. In the spring of 1805, he started for the western part of the country, bent, as was generally believed, upon establishing a government in the Mexican territories, and possibly comprising a portion of the Louisiana purchase. He bought a large tract of land on Red River, and intimated that the conquest of Mexican states was a part of the plan. It was in the course of these operations that he plundered the famous Blennerhassett (q.v.). President Jefferson caused him to be arrested (Feb. 19, 1807, in Alabama) on a charge of treason, for which he was tried the next month at Richmond, Va. The jury gave a verdict of acquittal, and the next year he visited Europe to raise the means for an attempt upon Mexico. Four years of effort amounted to nothing, and in 1812 he returned in extreme poverty, and began to practice law in New York; but his course had alienated the people, and he could never regain his position in the courts. At the age of 78 he married Madame Jumel, a widow, who had a large estate in the upper part of the city of New York; but they were soon afterward divorced, and B. died in 1836 on Staten Island in poverty and utter abandonment, not only because of his political course, but more in consequence of his social character. He had but one legitimate child, a daughter named Theodosia, who became

the wife of Joseph Allston, governor of South Carolina. This daughter was probably the only human being except himself whom B. ever really loved; and she sailed from Charleston in the spring of 1812 on a visit to her father (who had just arrived from Europe), but the schooner on which she was a passenger was never afterwards heard of. There have been many stories told of its fate, and three or more dying prisoners have given relations of their part in the robbery and destruction of the vessel, but none have proved trustworthy. The most probable theory is that the schooner foundered off Cape Hatteras in a furious storm that came soon after she sailed. See Parton, *Life and Times of Aaron Burr* (1858); Mrs. Stowe's *The Minister's Wooing* (1859).

**BURBANPOOTER.** See BRAHMAPUTRA.

**BURRIANA**, a t. of Spain, in the province of Castellon-de-la-Plana, about 8 m. s. from the town of that name, is situated on the left bank of the Rio Seco, about 1 m. from its mouth in the Mediterranean. It has a pop. of about 10,000, who are chiefly engaged in agriculture and fishing; and exports wine, oil, and fruit.

**BURRILL, JAMES, LL.D.**, 1772-1820; b. R. I.; graduated at Brown university, and in 1791 began practicing law. From 1797 to 1813, he was attorney-general of Rhode Island; in 1816, chief-justice; and in 1817, senator in congress, where he was an able opponent of the Missouri compromise.

**BURRITT, ELIHU**, a distinguished advocate of the doctrines of the peace society, and a linguist widely known as "the learned blacksmith," was born at New Britain in Conn., 1811. He was brought up to the trade of a blacksmith, but devoted all his leisure to study, especially to mathematics and languages. In the latter field of study, his range was very extended, embracing more or less Latin, Greek, Hebrew, Arabic, and other oriental tongues, and almost all modern European and Slavonic languages. He is, however, much better known to the world as an earnest apostle of peace than as a scholar. To preach the doctrine of "universal brotherhood," Burritt traveled much through Europe and the United States. His chief works are *Sparks from the Anvil*, *Olive Leaves*, *Peace Papers*, and *Lectures and Speeches*. He also took a prominent part in the peace congresses of Brussels, Paris, Frankfurt, London, and Edinburgh; and in advocating an ocean penny-postage. For many years he resided in England, part of the time as U. S. consul at Birmingham. He d. 7th Mar., 1879. See *Life* by Northend (1879).

**BURROUGHS, GEORGE**, a graduate of Harvard, and preacher in Falmouth, Me., in 1678, and in Salem in 1680. He was accused of witchcraft in having "tortured, afflicted, pined, consumed, wasted, and tormented" one Mary Wolcott. Though a man of the most unblemished character, he was condemned and hung at Salem, Aug. 19, 1692.

**BURROUGHS, JOHN**, b. Roxbury, N. Y., 1837; began as school-teacher in his native village; married before he was twenty-one years of age, and went to New York, where he soon drifted into journalism. He received an appointment in the treasury department at Washington, 1863, but since 1874 has engaged in farming at Esopus, N. Y. His contributions to periodical literature have made him widely known as an enthusiastic lover of nature, especially in her uncultivated aspects, and a refined and appreciative critic. Many of his essays have been collected into book form under the following titles, *Wakes Robin* (1870); *Winter Sunshine* (1873); *Birds and Poets* (1875); *Locusts and Wild Honey* (1878); *Pepulon* (1881); *Fresh Fields* (1884); *Signs and Seasons* (1886); *Indoor Studies* (1889); *Riverby* (1894); *The Writings of John Burroughs* (9 vols., 1895), etc.

**BURROUGHS, STEPHEN**, 1785-1860; b. New Hampshire; successively a soldier, student at Dartmouth college, privateer, physician, and pastor of a Congregational church, until convicted of passing counterfeit money, when he was imprisoned. Escaping to Canada, he continued his counterfeiting. Late in life he became a Roman Catholic, and ended his days as a private teacher. He published *Memoirs of My Own Life* (1811-1848).

**BURROWING OWL**, or COQUIMBO OWL, *Athens cunicularia*, a species of owl that lives in the burrows of the prairie dog, or digs a home for itself; and seeks its prey (chiefly small insects) in daylight rather than, like other owls, in the night.

**BURROWS, WILLIAM**, 1785-1813; entered the U. S. navy in 1779, and served on the Barbary station. In the war with England he commanded the *Enterprise* in the engagement with the *Boxer*, off Portland, Me., Sept. 5, 1813. The *Boxer* was taken; but B. was mortally wounded, living only long enough to receive the surrender. The English commander was also killed, and both officers were buried near each other at Portland.

**BURRSTONE.** See BUHRSTONE.

**BURSARY** (Fr. *bourse*, Lat. *bursa*, a purse), the annual proceed of a sum permanently invested for the maintenance of a student at a university. A number of small bursaries were till lately the only equivalents at the Scotch universities for the scholarships of the English. Their large number and the small amount of each was, in course of time, found to have a prejudicial effect, more particularly at Aberdeen, which possessed the largest number, and where a practice had obtained of multiplying bursars on the



foundation, at the discretion of the *senatus* or patrons. Both the university commissioners of 1831 and those of 1863 expressed their opinion that it was less provision for encouraging learning in its earlier stages than adequate inducements to persons who have passed the preliminary class to make learning the business of their lives, that was wanted in Scotland. The general effect of the ordinances issued by the commissioners of 1863, in carrying out the directions of act 21 and 22 Vict. c. 83, was to consolidate some of the smallest bursaries into others of greater value, and in some instances to remove restrictions that had proved injurious, while a large number was thrown open to competition. There are, however, still a large proportion of purely presentation bursaries, and in some there is a preference given to a particular name, or to natives of a particular district. At Aberdeen, the commissioners founded eight scholarships of £65 annual value; at St. Andrews they so modified the Ramsay foundation as to found two scholarships of £60; and in Edinburgh they acquired funds sufficient to establish the Pitt and Mackenzie scholarships of £80 and £120 annual value. Since 1863, a large number of scholarships, tenable by graduates, and of fellowships, have been founded by private individuals on a more liberal scale than the old bursaries, particularly in Edinburgh and Glasgow. At Edinburgh there are at present about 200 bursaries, of which above 100 are in arts, and 80 in theology; they vary in amount from £2 15s. 6d. to £100. Among the most considerable of them are two of £90, founded in 1809 by Dr. Donald Grant, for students of his own surname; one founded by sir John Macpherson in 1821, worth £88, for Highland students; the Jardine competition bursary of £40, four Lennie bursaries of £48, four Bruce bursaries of £30, and three of £40; two competition bursaries of £100 and £50 respectively, founded in 1860 by Mr. Patrick of Roughwood, for young men educated in Ayrshire; two bursaries founded in 1865 by Miss Scott of Horselehill, and one by Miss Harrison in 1867, for £40 each; and two founded by the Rev. John Spence in 1867, for £50. The scholarships for graduates are about 80, varying in amount from £60 to £120; and there are about eight fellowships, varying from £100 to £160. Of 200 bursaries at Glasgow, many of them small, the most considerable are six founded by lord Dundonald in 1672, four in philosophy and two in divinity, of £40; two by Mr. Patrick, of £100 and £50 respectively; and the Brisbane medical bursary of £50, founded in the year 1877. Glasgow has also 14 exhibitions to Balliol college, Oxford, on the Snell foundation (q.v.), and has about 30 scholarships of from £50 to £200, the highest being the four founded by Mr. George A. Clark, in 1872. At St. Andrews there are 81 bursaries belonging to the United college, these varying in amount from £5 to £50; 20 belonging to St. Mary's, varying from £6 to £50; and 20 of the same value transferable from the United college, when the bursars proceed to the study of divinity; two Ramsay scholarships of £50; one Guthrie scholarship worth £100 the first year and afterwards worth £50; one Patrick Kidd scholarship, worth about £40; and two scholarships of £50, founded by Mrs. Tyndal Bruce. At Aberdeen there are about 250 bursaries, varying from £5 to £50; and 11 scholarships of £65 to £70, tenable for 4 years, also some valuable exhibitions to Cambridge.

**BURSCHENSCHAFT**, an association organized by German students for the purpose, originally, of reforming the excesses and outrages customary at the universities of Germany, and to arouse a spirit of nationality by uniting the students of different universities. The first organization of the B. took place at Jena in 1815, and most of the students who became members had fought in the German war of independence; during 1815-17 it spread to Tübingen, Heidelberg, Halle, and Giessen. As it was evident that the students were to be disappointed in the hope that the war would be followed by political reforms, the B. of Jena decided to have a general gathering of the associations, which took place at the Wartburg, Oct., 1817. At this festival all the universities were represented, and in Oct. of the following year, delegates from 14 universities adopted a constitution, which was agreed to by all except the universities of Austria, Göttingen, and Landshut; they adopted the colors of the German empire, black, red, and gold, and resolved to hold annual conventions. In 1819, Kotzebue, the German dramatist, who had been declared by the B. a traitor to his country, was assassinated by Sand. After a conference at Carlsbad, the German government took steps to suppress the B., but without avail; it resulted only in their holding secret instead of public meetings. The original plan of a national B. was revived in 1827; the chief obstacle was the difference of view held by the Germanen, who desired to bring about the unity of Germany by practical and political means, and the Arminen, who laid more stress on the ideal unity of their country and the cultivation of individual powers. The views of these two parties were discussed at the convention of Bamberg in 1827, and in Frankfort in 1831; and, although the Arminen had the larger number of followers, they were obliged to give way to the more energetic Germanen. On the 25th of Dec., 1832, the B. resolved to attain the freedom and unity of Germany by a revolution; all the students were called upon to support the B., whose headquarters were at Frankfort-on-the-Main. The attempt was made at Frankfort in June, 1833, in which nearly 2000 students were implicated. It resulted in the arrest and prosecution of students at all the German universities, and many of them were imprisoned and disfranchised. The students of Vienna, who had never before been connected with the B., took a prominent part in the revolution of 1848.

**BURSIAN**, CONRAD, an archaeologist and classical scholar, b. in Saxony, Nov. 14, 1880, and educated at Leipzig. He held professorships in the universities of Leipzig, Tübingen, Zürich, Jena and Munich, and was the author of a history of classical philology in Germany (1888) and of a work on the geography of Greece. He died in 1888.

**BURSLEM**, a t. of Staffordshire, on the Trent and Mersey canal, in the pottery district, is a station on a branch of the North Staffordshire railway. It forms part of the parliamentary borough of Stoke-upon-Trent. Pop. '91, 30,862. The abundance of coal and the variety of clays have made B., since the 17th c., one of the chief seats of the fictile manufacture. Porcelain and pottery of all kinds—Parian, iron and stone ware, etc.—are produced on a large scale, as well as encaustic tiles. There is also a glass manufactory here. The affairs of the town are managed by a "local board of health." At Birche's head, a mile and a half from B., stands a large service reservoir of the Staffordshire waterworks company, from which the town and neighborhood are supplied with excellent water. A fine new town-hall was erected in 1865, which, besides the usual municipal offices, contains lecture rooms and news rooms. B. was the native place of Josiah Wedgwood, who in the middle of the 18th c. greatly improved the manufacture of pottery.

**BURT**, a co. in e. Nebraska, on the Missouri river and the Chicago, St. Paul, Minneapolis, and Omaha railroad; 468 sq. m.; pop. '90, 11,069. Co. seat, Tekamah.

**BURTON**, ASA, D.D., 1752–1836; a graduate of Yale in 1777; in 1779 settled as pastor of a Congregational church in Thetford, Vt., where he remained all his life. He published many sermons, and *Essays on Some of the First Principles of Metaphysics, Ethics, and Theology*. See *Memoir* by Thomas Adams.

**BURTON**, JOHN HILL, advocate (member of the Scottish bar), achieved for himself a place in the world of letters by a variety of works, all remarkable for ability, and several for original thought. B. was born at Aberdeen on the 22d of Aug., 1809; his father was an officer in the army, and his mother the daughter of an Aberdeenshire laird. Having graduated at Marischal college, Aberdeen, he became an apprentice to the profession of law in his native city; which, however, he afterwards abandoned for the higher sphere of the Edinburgh bar. Here, with time on his hands, he devoted himself to study and letters. For a long series of years, from 1833 downwards, he was a contributor to the *Westminster Review* of articles on law, history, and political economy; and for several years he contributed to *Blackwood's Magazine* literary sketches. Among his original works may be mentioned, *The Life and Correspondence of David Hume*, 3 vols. (1846); *Lives of Simon Lord Lovat and Duncan Forbes of Culloden* (1847), both excellent biographies; *Political and Social Economy* (1849), which is a valuable, condensed, and lucid contribution to the literature of social science; *Narratives from Criminal Trials in Scotland*; *A Manual of Scottish Law*; *A Treatise on the Law (Scottish) of Bankruptcy*; *The History of Scotland from the Revolution to the Extinction of the Last Jacobite Insurrection*, 2 vols. (1858); *The History of Scotland from Agricola's Invasion to the Revolution of 1688*, 7 vols. (1867–70); *The Book-Hunter* (1862); *The Scot Abroad*, 2 vols. (1864); *The Cairngorm Mountains* (1864). A new edition of the *History of Scotland*, enlarged and partly rewritten, appeared in 8 vols., 1878. Burton edited vols. i. and ii. of the *Register of Privy Council* (Scotland) for 1545–78; and in 1879 he brought out a history of the reign of queen Anne. The high merits of B.'s historical works have been universally admitted. He further edited the works of Jeremy Bentham (nominally in conjunction with the late sir John Bowring), with an able introduction; and he published a volume of *Benthamiana*. B. was, in 1854, appointed secretary to the prison board of Scotland; and on the abolition of that board in 1860, he remained as stipendiary manager and secretary in connection with the Home office. On the passing of the prisons (Scotland) act, 1877, B. was appointed one of the prison commissioners for Scotland. He held the old office of historiographer royal for Scotland, was LL.D. of Edinburgh university, and D.C.L. of Oxford. He d. Aug. 10, 1881.

**BURTON**, SIR RICHARD FRANCIS, one of the most daring and successful of modern travelers, was b. in Hertfordshire, England, March 19, 1821. He was educated in France and England. In 1842, he entered the Indian army, and served many years in Sindh. While in this employment, he exhibited a remarkable facility in acquiring the eastern languages, and a still more remarkable dexterity in imitating the appearance and habits of the natives of India. In 1851, he published his first important work—*Sindh, and the Races that inhabit the Valley of the Indus*—full of graphic description, and interesting to all readers. B. had acquired a very familiar acquaintance with Hindustani, Persian, and Moulani. He had devoted special attention to Arabic, and had made such progress as to be able to speak it like a native. Possessed of these qualifications, he resolved to explore Arabia in the disguise of an Afghan pilgrim; and after a visit to England, he set out on his journey. Political commotions prevented him from traversing the whole country, as he intended; but his *Personal Narrative of a Pilgrimage to El Medinah and Meccah* (1855) records one of the most daring feats on record. A perpetual strain on the ingenuity was necessary to keep up his assumed character, most difficult in moments of fatigue, and in the midst of shrewd and observant fellow-travelers. The next journey undertaken by B. was into the country of the Somaulis, in eastern Africa. It proved less successful than was anticipated. B.'s com-

panion, Lieut. Stroyan, was killed, and B. himself was wounded. He succeeded, however, in reaching Harar (q.v.), a most important town in eastern Africa, not before visited by any European, and in penetrating a vast and populous region scarcely known to geographers. The journey led to a still more important series of expeditions—those to the country of the upper Nile. Towards the end of 1856, B. set out in company with Lieut. Speke, also of the Indian army, to ascertain the truth of the reports collected by the missionaries, that a vast sea existed in the heart of the continent. The journey is one of the most memorable of our time. It led to the discovery and exploration of the great lake of Tanganyika, and the opening up of the eastern part of the continent. B. was rewarded with the medal of the geographical society. His health had been affected by his African journeys, and he sought to recover it by a journey in North America, from which he brought the first reliable account of the Mormons. In 1861, B. was appointed consul at Fernando Po, on the w. coast of Africa, and while holding this appointment, he visited the Cameroon mountains, and went on a mission to the king of Dahomey, the incidents of both journeys being recorded in two of his most interesting works. B. was subsequently the consul at Santos in Brazil, and at Damascus; and on the death of Mr. Charles Lever in 1873, B. succeeded him in the post of British consul at Trieste. B. visited the Guinea coast, '82. He died in 1890.

The following is a list of the principal works of Capt. B. not mentioned above: *Sindh, or the Unhappy Valley* (1851); *Goa and the Bue Mountains, or Six Months of Sick Leave* (1851); *Falconry in the Valley of the Indus* (1852); *First Footsteps in East Africa, or an Exploration of Harar* (1856); *The Lake Regions of Central Africa, or a Picture of Exploration* (1860); *The City of the Saints, and Across the Rocky Mountains to California* (1861); *Abeokuta, or the Cameroon Mountains* (1863); *The Nile Basin; A Mission to Gelele, King of Dahomey, with Notices of the so-called Amazons, etc.; Explorations in the Highlands of Brazil; Vikram and the Vampire; Zanzibar; Two Trips to Gorilla Land; Ultima Thule, or a Summer in Iceland; Etruscan Bologna* (1876); *Sindh Revisited* (1877); *The Gold Mines of Midian and the Ruined Midianite Cities* (1878), giving an account of B.'s investigations in that region during journeys in 1876 and 1877; *To the Gold Coast for Gold, 1882*. In 1885-88 he published a literal translation of the *Arabian Nights* (q.v.), under the title of *The Thousand Nights and a Night* (10 vols., and 6 vols. of supplement), of which his wife issued an expurgated edition for popular perusal. Lives by Hitchman (1887), his wife (1894), and Georgiana M. Stisted (1897). He left a MS. to his widow, Lady Isabel Burton, consisting of a translation, with original notes, from the Arabic of *The Scented Garden*, which she destroyed as a moral act, though it had been valued at \$30,000. She d. in London, in 1896.

**BURTON, ROBERT**, author of the *Anatomy of Melancholy*, was b. at Lindley, in Leicestershire, in 1576, and studied at Brasenose and Christ church, Oxford. In 1616, he was appointed to the vicarage of St. Thomas, and in 1628, to the rectory of Segrave in his native county. He appears, however, to have continued all his life at Christ church, where he died in 1640, leaving legacies of £100 each to the Bodleian and Christ church libraries, and as many of his books as they did not already possess. A monument was erected to his memory in Christ church cathedral. B. is described by Anthony Wood as a good mathematician, a dabbler in nativities, a well-read scholar, and a thorough-paced philologist. "As he was by many accounted a severe student, and a melancholy and humorous person, so by others who knew him well, a person of great honesty, plain-dealing, and charity. I have heard some of the ancients of Christ church often say that his company was very merry, facetie, and juvenile." His *Anatomy of Melancholy*, in which he appears under the title of Democritus Junior, is one of the most curious collages of heterogeneous elements ever put together. It consists mainly of an extraordinary mass of quotations from old and obscure writers, strung on a thread of rambling reflection, often tiresomely pedantic, but relieved by quaint touches of humor and feeling.

**BURTON, WILLIAM EVANS**, 1804-60; b. London; son of William George B., author of *Biblical Researches*. He was intended for the church, and received a classical education; at 18 took charge of his father's printing establishment and edited a magazine. From amateur acting he drifted towards the regular stage, and made a successful début at the Haymarket, in 1832. He began also to write dramas, one of which was played simultaneously at five London theaters. In 1834, he came to the United States, where he was always prominent as actor or manager, chiefly in Baltimore, Philadelphia, and New York. In Philadelphia he established the *Gentleman's Magazine*, a literary monthly. His greatest success was in the management of the Chambers street theater, New York, where, with Brougham and others, he produced dramas from several of Dickens's novels. His own forte was low comedy, and some of his characters were so established in public favor that no actor has satisfied an audience in them since his death. Such were "Captain Cuttle," "Toodles," "Micawber," "Aminadab Sleek," "Paul Pry," and others. He was a fine scholar, and had a superior library, particularly of Shakespearian literature. He was for several years the editor of the *Literary Souvenir*, and published in two vols. a *Cyclopædia of Wit and Humor*.

**BURTON-ON-TRENT**, a market t. in Staffordshire, on the river Trent and the Midland railway. The Grand Trunk canal also passes the town, and enters the Trent below. A bridge of 34 arches, built before the Norman conquest, here crossed the river.

but was replaced in 1864 by a new one of 29 arches. The population of B. has been nearly trebled within the last 20 years, being in 1891, 46,047. This is owing to the rapid extension of the brewing of ale, which is the staple product of the place. There are numerous breweries in B., some of them on a scale of unparalleled magnitude. The two establishments of Bass and Allsopp cover together more than 250 acres of ground, and can produce yearly about two million barrels of ale. There are, of course, extensive cooperages, and also iron-foundries. The public edifices are not particularly noticeable.

**BURTSELL, RICHARD LALOR, PH.D., D.D.**, was born in New York, April 14, 1840. He pursued his studies at the Propaganda in Rome, taking his degree there, and receiving his ordination in 1862. Returning to America he was appointed assistant pastor of St. Ann's church, and in 1868 assigned to the new parish of the Epiphany. He was the first incumbent in the office of "Defender of the Marriage Tie" (q.v.), instituted in America by the Third Plenary Council of the Catholic church, held in Baltimore in 1864. In 1887, he identified himself with a movement in which the Rev. Dr. McGlynn (q.v.) was concerned, and was counsel and adviser to Dr. McGlynn after his suspension from priestly functions. This involved him in personal trouble. He was removed from the office of "Defender of the Marriage Tie" in 1887; official notice of his action was taken in 1889; and he was ordered to retire from his position as pastor of the Church of the Epiphany, to a small parish in Rondout, N. Y. He appealed from the order of the Archbishop to the Propaganda at Rome, and by that body was ordered to make his submission to the archbishop. He preached his farewell sermon to his congregation in July, 1890; appealed to Rome for reinstatement; and was refused, in 1890.

**BURTSCHIED, or BORCETTE**, a t. of Rhenish Prussia, about half a mile distant from Aix-la-Chapelle, with which it is connected by an avenue of trees. It has manufactures of woolen cloths and cassimeres, and celebrated sulphur springs and baths, with a temperature of 106° to 155° F. Pop. '90, 13,388.

**BURY**, a flourishing manufacturing t. in the s.e. of Lancashire, on a rising ground backed by hills on the n. and e., between the Irwell and the Roche, 9 m. n.w. of Manchester. It was early a seat of the woolen manufactures, carried on by Flemings, but these, though still considerable, now yield in importance to those of cotton. Besides spinning and weaving factories, there are important print, bleach, paper, and dye works, and some large foundries and engine manufactories. In the vicinity are excellent freestone quarries, and abundant coal-mines. The town has recently been much improved in drainage, and an ample supply of water has been secured from hills at a distance. Pop. '91, 57,212. B. returns one member to parliament. Some improvements in the cotton manufacture arose here.

**BURYING BEETLE, *Necrophorus***, a genus of coleopterous (q.v.) insects, of the tribe or family *silphales*, with short club-shaped antennae, remarkable for their habit of burying the bodies of mice, moles, and other small animals, in order to deposit their eggs in them, and to provide a supply of food for their larvae. Some of the species are natives of Britain, among which is *N. vespillo*, the species of which the habits were first observed, which is, however, more common in some parts of continental Europe. It is a black beetle, about an inch long, with two bright orange bands across its back, and having an excessively fetid smell, which long adheres to whatever it touches. Its sense of smell would seem to be extremely acute, and a dead animal soon attracts it, a pair generally arriving together, male and female, to feed upon the body, and the male to proceed to its interment, if sufficiently small, previous to which, however, they have sometimes to drag it to some distance to a place suitable for their purpose. The head of the insect is the only tool employed in the operation, and is held sloping outwards, and employed in a manner which exhibits great muscular power. A furrow is first made around the body, then another within the first, and so on till the earth is so excavated from beneath, that the body begins to sink, when the insects, by great efforts, drag it down into the hole, and when it is fairly in, the excavated earth is thrown back over it. The female then lays her eggs in it; and when this is accomplished, and the cravings of appetite are satisfied, it is left for the larvae, which are of a lengthened form, with six feet.

**BURY ST. EDMUNDS, or ST. EDMUNDSBURY**, an ancient borough in Suffolkshire, on the Upper Larke, 26 m. n.w. of Ipswich. It is well built, and delightfully situated. Pop. '91, 16,680. It returns two members to parliament. It has a trade in wool, butter, corn, and cheese, but no manufactures. A very complete system of drainage has been carried out, the sewage being conveyed to a distance, and, by means of pumps, applied to irrigation. A new corn exchange was erected in 1862; in 1864, the Suffolk general hospital was rebuilt. B. received its name from Edmund, the Saxon king and martyr, who was crowned here on Christmas day, 856; taken prisoner, and put to death by the Danes. On the site of his tomb, six priests founded a monastery; and here Canute raised a Benedictine abbey, which in time became the richest and most important in England, save that of Glastonbury. From 1020 to its dissolution by Henry VIII., it was ruled over by a line of 88 abbots. The abbot was a spiritual baron of parliament, had judicial authority in all causes within the liberty of B., had the power of inflicting capital punishment, and the privilege of coining. At the dissolution, the annual income was equivalent to about £50 000 sterling. Of this magnificent establishment, little now remains but the western gate, erected in 1327, a noble relic of the decorated Gothic

style; and the "church-gate," a quadrangle tower of massive simplicity, 86 ft. high. The churchyard, to which this tower formed the portal, includes, besides the abbey ruins and some other buildings, the fine old churches of St. Mary and St. James. The celebrated grammar-school of B. was founded by king Edward VI. in 1550, and is free to sons of the inhabitants of the town. It has 2 scholarships at Cambridge, and 6 exhibitions to each university, and has produced many eminent scholars. Among the many religious and charitable institutions connected with the abbey, of which portions still exist, is St. Saviour's hospital, founded by that notable abbot, Samson, whose life and actions, as recorded by Jocelyn of Brakelond, Mr. Carlyle has so vividly recalled in his *Past and Present*. The poet Lydgate was a monk in this abbey; and sir Nicholas Bacon was born here.

**BUSACHINO**, or **BISACQUINO**, a t. of Sicily, in the province of Palermo, about 29 m. s.s.w. of the city of that name. It has manufactures of linen, and a population of about 9000.

**BUSA'CO**, a ridge or serra on the n. side of the river Mondego, in the province of Beira, Portugal, about 20 m. n.n.c. of Coimbra. Here Wellington, with about 40,000 British and Portuguese troops, repulsed the attack of Massena with 65,000 French, 27th Sept., 1810. Unable to force the position, Massena turned it by a pass over an adjoining ridge, and Wellington retired behind the lines of Torres Vedras, which indeed it was his intention to do, even if there had been no battle.

**BUSBY**, RICHARD, the most famous of English schoolmasters, was b. at Luton, Northamptonshire, Sept. 22, 1606. Educated at Westminster school, and Oxford, he was, in 1640, appointed head-master of Westminster school, the duties of which office he continued to discharge until his death in 1695. He is the type of pedagogues alike for learning, assiduity, and the application of the birch. He was a most successful teacher, and at one time could point to no less than sixteen occupants of the bench of bishops who had been educated in his school; and altogether, he has the reputation of having "bred up the greatest number of learned scholars that ever adorned any age or nation." He published several works, but they were chiefly for school use.

**BUSCA**, a t. of Piedmont, situated on the left bank of the river Maira, an affluent of the Po, about 9 m. n.w. of Coni. Excellent wine is produced in the vicinity. Pop. about 9000.

**BUSCH**, JOHANN GEORG, 1728-1800; a German philanthropist and statistician, professor of mathematics in the Hamburg gymnasium. He established an association for the promotion of art and industry, and a school of trade, the latter becoming especially famous. He wrote largely upon the history and theory of trade and commerce, and on questions of political economy.

**BUSCH**, JULIUS HERMANN MORITZ; b. Dresden, 1821; studied theology and philosophy at Leipzig, but began literary life as a translator of Dickens, Thackeray, and other English authors. In 1851 he visited the U. S.; in 1853 he published *Wanderings between the Hudson and the Mississippi*. Subsequently he became known as a political writer, and in 1870 received an appointment in the foreign office at Berlin, which brought him into close relationship with Bismarck, whose views he ardently embraced. A part of his diary kept during the French campaign, was with Bismarck's permission published in 1878 under the title of *Count Bismarck and his People*, and made a great stir in Europe and the U. S.

**BÜSCHING**, ANTON FRIEDRICH, a celebrated geographer, was b. Sept. 27, 1724, at Stadthagen, in the principality of Schaumburg-Lippe, Germany. He studied theology at Halle, where he enjoyed the friendship of Baumgarten. In 1754, he was appointed extraordinary professor of philosophy in Göttingen, but soon incurred the displeasure of the Hanoverian government by his religious heterodoxy. Göttingen thus becoming an unpleasant residence to him, he accepted an invitation, in 1761, to St. Petersburg as preacher to a Protestant congregation there. In 1765 he returned to Germany, and in 1766 was called to Berlin as upper consistorial councillor and director of a *Gymnasium* in Berlin, where he died, May 28th, 1793. Until the appearance of B.'s *Erdbeschreibung*, the first volume of which was published at Hamburg in 1754, neither Germany nor any other nation possessed a geographical work which made any pretension to scientific treatment or completeness of execution. The changes in the political arrangements of the world have, however, deprived the work of its original value, but it has been corrected and edited by subsequent writers. Of his other numerous publications, the most important is the *Magazin für Historie und Geographie* (25 vols. Hamburg, 1767-83).

**BUSENBAUM**, HERMANN, a theologian of the order of Jesuits, was b. in 1600 at Nottelen in Westphalia. About 1640, he taught ethical philosophy at Cologne, and later was appointed rector of the college of Jesuits at Münster. He died 31st Jan., 1678. His work entitled *Medulla Theologiae Moralis* (1645), was celebrated as a standard authority in the seminaries of the Jesuits, though several of its propositions were condemned by the pope. It has gone through more than fifty editions. It was enlarged by the Jesuit Lacroix (1707), and re-edited, with improvements and additions, by the Jesuit Montausan in 1729, and again by Alfonso de Ligorio in 1757. As it was found that the work contained doctrine in favor of regicide, it was burned, by order of the parliament of Toulouse, on the occasion of an attempt made on the life of Louis XV. by Damiens in 1757.

**BUSENTO**, a river of Salerno, Italy, emptying into the bay of Busento. This is the stream that was turned from its channel by the followers of Alaric, who buried that great leader in the original bed of the stream and then restored the water to its natural course so that no enemy could find the grave.

**BUSH**, GEORGE, D.D., 1796-1859; b. Vt.; a graduate of Dartmouth college and Princeton seminary; ordained in the Presbyterian church, and four years a missionary in Indiana. In 1831, he was appointed professor of Hebrew and oriental literature in New York university. In 1832, he published a *Life of Mohammed*, and the next year a work on the millennium, in which he held that the beginning of the millennial age was marked by the triumph of Christianity over Roman paganism. He also wrote a Hebrew grammar, and seven volumes of commentary on the Old Testament. In 1844, he conducted *The Hierophant*, devoted to the explanation of prophetic symbols, and published a work in which he opposed the idea of a physical resurrection of the body. In 1845, he united with the New Jerusalem church, and began to translate Swedenborg's works. In support of these doctrines, he edited the *New Church Repository*. His latest work was *Priesthood and Clergy unknown to Christianity*.

**BUSH ANTELOPE**, **BUSH BUCK**, and **BUSH GOAT**, names common to a number of species of antelope (q.v.), natives chiefly of the southern and western parts of Africa, forming a section of the genus *antelope*, which some naturalists have attempted to erect into a distinct genus (*philatomba* or *cephalopus*). They are animals of more compact form, shorter limbs, and greater strength, but much less agility, than the true or typical antelopes. They are remarkable for the arched form of the back. They have short, straight, or slightly curved horns, situated far back, and generally peculiar to the male sex, with usually a long tuft of hair between them. They have no tear-pits, but instead of them, a naked glandular line, formed of two series of pores, on each cheek. They frequent jungles, thick forests, and beds of reeds, and when pursued, seek to escape by diving into a thicket. The common or white-backed B. A. of Sierra Leone (*antelope ayscultrix*) is about 8 ft. high at the shoulder; it is a dull, heavy, awkward-looking animal; keeps concealed in the thickets during the day, living singly or in pairs, and feeds in the open spaces in the early mornings only. To shoot it, sportsmen place themselves on the margin of the woods, and watch their opportunity as it comes out to graze. Its flesh is more esteemed than that of the more agile antelopes. Nearly 20 other species are usually ranked in this section of antelopes, among which is the *kleene boc* (*antelope pygmaea*) of s. Africa, a species abundant in many parts of Cape Colony, of very small size, not more than one foot in height at the shoulder, and with horns only about 1½ in. in length. It is a timid, gentle animal, easily domesticated. It differs from the typical bush antelopes in the great activity which it displays.

**BUSHEAB**, a low, flat island in the Persian gulf, about 11 m. from the Persian coast, in lat. 26° 50' n., long. 58° 12' east. It is about 18 m. long, narrow, and well-peopled, with a town and harbor at its western extremity. Its proper name is *Khoshaub*, signifying "good water."

**BUSHEL** [Fr. *boisseau*, allied to *boi(s)te*, box, butt; Lat. *butta*, a measure in general], a dry measure used in America for grain, fruit, etc. The quarter contains 8 bushels, and the bushel 8 gals., the gallon measuring 277.274 cub. in., and holding 10 lbs. avoirdupois of distilled water. Hence the imperial bushel contains 80 lbs. of water, and measures 2218.2 cub. inches. The old Winchester bushel measured 2150 cub. in.; hence 33 Winchester bushels = 32 imperial bushels, nearly.

**BUSHIRE**. See **ABUSHEHR**.

**BUSHMAN'S RIVER**, or **BOSJESMAN'S RIVER**, in the e. part of the Cape Colony, s. Africa, is about 200 m. long, and forms on its lower course the w. boundary of Albany, whose capital is Graham's Town. Its general direction is from n. to s., its mouth being about 88½° s., and about long. 26½° east.

**BUSHOEN**, or **BOSJESMANS**; so named by the Dutch colonists, but calling themselves **SAAB**, or **SAAN**; an aboriginal race of s. Africa, somewhat like, and yet differing from, the Hottentot, but like them having nothing in common with the Kaffer or negro. They rank with the savage of Australia among the lowest existing types of mankind, and are in a most degraded and destitute condition. They are of small stature, of dirty yellow color, and very repulsive features. The cheek-bones are large and prominent, the eyes deep set and crafty in expression, nose small and depressed, and the hair in small woolly tufts with bald spaces between. Of 150 measured by a traveler, the tallest man was 4 ft. 9 in., and woman 4 ft. 4 in. Some are well proportioned, active, and capable of enduring great privations and fatigue. Those furthest n., near lake Ngami, are considerably larger in body. They clothe in skins and are fond of ornaments, decorating their arms and legs with beads and rings, and the women sometimes paint their faces red. They dwell in huts of reed or in holes in the ground; in the mountain districts they live among the rocks with mats for shelter. They have no cattle, nor any animals except a few half-wild dogs, nor have they the least signs of agriculture; but as they live by hunting they are well acquainted with the habits of animals, and follow the herds of antelope in their migrations. Their weapons are bows and arrows, the latter tipped with bone or iron, and poisoned with vegetable matter

mixed with the venom of snakes or spiders, or the entrails of an extremely poisonous caterpillar are used alone. On account of the use of these fatal poisons the B. are held in dread by neighboring tribes. The discovery of their rude tools for digging tubers, scattered over wide regions not now occupied by them, indicates the existence of greater numbers of B. in earlier times. They have no approach to tribal organization, nor any chiefs; bodily strength forming the only distinction of superiority. Their various dialects are not understood by the Hottentots, the tongue of the latter being more agglutinative, that of the B. more monosyllabic; the Hottentots use gender in names, while the B. do not. The Hottentots can count 20; the B. only 2—calling all above that "many." The B. possess a pictorial faculty not known in any other south African tribe, and the rocks of the Cape Colony and Drakenberg mountains show many examples of Bushman drawings of men, women, children, and animals. Rings, crosses, and other signs, drawn in blue on rocks and stones, and believed to be centuries old, have given rise to the suggestion that these may be the remains of hieroglyphic writing.

**BUSHNELL**, HORACE, D.D., 1802-76; b. Conn., graduated at Yale in 1827, where he studied law and theology; in 1833, became pastor of the North Congregational church in Hartford. He was a voluminous writer on theological subjects; some of his works being *Principles of National Greatness*; *Christian Nurture*; *God in Christ*; *Christian Theology*; *Sermons for the New Life*; *Nature and the Supernatural*; *Work and Play*; *Christ and His Salvation*; *Woman's Suffrage*, *the Reform Against Nature*; *The Vicarious Sacrifice*. He was also a writer for various periodicals and newspapers. He was a bold and original thinker, with peculiar eloquence of style. Though strongly evangelical in belief, he denied the Calvinistic theory of the atonement (known as the "satisfaction theory"), and gave less than the ordinary emphasis to the distinction between the persons in the Trinity. These, with other divergences, led to his being accused of heresy; but ultimately the fellowship of the Congregational churches was found broad enough to include him, and he kept his standing therein with growing influence until his death. During his later years his health compelled his relinquishment of the active pastorate, but his labors in authorship were unintermitted. While his theory of the atonement has not commended itself in its exact form to the majority of evangelical Christians, and is adhered to by no organized sect or party, it cannot be denied that his moral earnestness, his spiritual power, his wondrous suggestiveness, his brilliancy of thought and style, and his broad mental scope, have profoundly modified the thinking of the present age through almost the whole circle of Protestant denominations. Indeed, with his detestation of all provincialism and sectarianism, he would have chosen any other form of influence rather than that which is exercised by the leader of a party in the church.

**BUSHRANGERS**, in Australia, were originally runaway convicts, who had taken to the "bush" and become robbers. In the early years of the century they established a reign of terror in what was then the sparsely settled Van Diemen's Land. In 1814 a band of bushrangers, 27 in number, carried on their operations till, in 1815, martial law was proclaimed in the district by the lieutenant-governor. Stern measures were taken to repress the crime. Under Governor Arthur (1824-36), 103 criminals were executed in two years. In 1830, a severe Bushranging Act was passed in New South Wales, where at one time a gang of fifty desperadoes in the Bathurst district fought regular engagements with the settlers and police, and only surrendered when a detachment of soldiers was brought up from Sydney. Ten of these men were executed, and the act, which was renewed in 1834, put a stop to bushranging on this scale. Outbreaks still occurred at intervals, as in 1840, but generally only three or four ruffians would band themselves together and, after a more or less brief and desperate course, would be captured or killed by the mounted police. In later years bushranging has been unfortunately facilitated by the colonial land laws, which allow people to settle in isolated spots among the mountains, beyond the reach of educational or religious influences, and outside the range of police supervision, and thus any scoundrel is permitted to choose the most remote haunt for his headquarters, to which he can retire after his raids. The pathless, thickly-wooded, mountainous districts of Eastern Victoria and New South Wales, with a cattle-dealing population that included numerous "sympathizers," have offered shelter to many bushrangers.

**BUSHWHACKERS**, a term much in use during the civil war (though well known before) to indicate men who pretended peace or neutrality, but who were ready to make secret attacks whenever opportunity offered. They were numerous in some western states, where many of them were summarily shot as outlaws.

**BUSYRIS**, an Egyptian t., capital of the B. nomos, in the hieroglyphic language, the "Place of Osiris," believed to correspond to the modern Abusir, and situated about the middle of the delta. It was supposed to be near the entrance of the gates of Elysium. Close to B. was the pyramid of king Sahura, of the 4th dynasty, known as the Sa-ba, or "pyramid of the rising soul." The shrine of the goddess Isis was in B. and a great annual festival and lamentation for Osiris was held there. The place was destroyed by Diocletian, but the Copts and Arabs have preserved the name in Bousiri and Abusir.

**BUSKIN**, a kind of half-boot, lacing tight to the leg. The ancient tragedians wore buskins (*cothurnæ*), often with thick soles, to add to their stature. Hence the B. is often put for tragedy, as the slipper (*soccus*, a flat-soled shoe) for comedy. In ancient sculpture.

Diana, and hunters in general, as well as men of rank and authority, are represented in buskins often highly ornamented.

**BUSS** is the name of a small vessel, usually from 50 to 60 tons' burden, much used in the herring fishery, especially by the Dutch. The B. has two small cabins—the one at the prow serving as a kitchen. The remaining space is a receptacle for fish.

**BUSSAHER'** (or *Bashahr*), a hill-state of Northern India, in the Punjab, on the border of Chinese Tartary (33° n. and 78° e. cross in its area). It is one of the most elevated and mountainous countries in the world, the lowest part being more than 3000 ft. above the sea, and much of it from 7000 to 12,000 feet. The Sutlej flows through the country from e. to w.

**BUSSANG**, or **BUSSA**, a town in Central Africa on an island in the Niger, in the western part of the Soudan. It is celebrated as the place near which Mungo Park, the great African traveler, was murdered. Its population has been variously estimated at from 10,000 to 18,000.

**BUSSEY**, BENJAMIN, 1757-1842; served as a private soldier in the revolutionary army; after the war, began business in Boston and accumulated a fortune, most of which, after the death of certain relatives, went to the support of the law and divinity schools in Harvard college, and the founding of a school of agriculture, for which special object he gave a large farm near Boston.

**BUSSON**, CHARLES, French landscape painter, b. in 1822, received a first-class medal at the Paris Exposition in 1878, and became an officer of the Legion of Honor in 1887.

**BUSSORA**. See **BASSORA**.

**BUSSU PALM**, *Manicaria saccifera*, a South American palm, growing in the tidal swamps of the Amazon, the only known species of its genus. The stem is only 10 to 15 ft. high, curved or crooked, and deeply ringed. The leaves are simple or undivided, and are the largest of the kind produced by any known palm, being often 30 ft. long, and 4 or 5 ft. wide. They are simply branched, drooping, and the fruit is of an olive color, large, hard, and three-seeded. The leaves make excellent and durable thatch, being split down the midrib, and laid obliquely on the rafters, so that the furrows formed by the veins lie in a nearly vertical direction, and serve as so many little gutters to carry off the water. The spathe, taken off entire, is used by the Indians as a bag, or the larger ones are stretched out to make caps.

**BUSSEY-RABUTIN**, ROGER, Count de, a French writer and soldier, 1618-1693; distinguished himself for his valor during the Fronde, and as the author of spirited ballads and epigrams. His best known work is entitled *Histoire amoureuse des Gaules*, 1665, in which he handled in a very free manner the amorous adventures of several ladies of the court. The work got him into trouble and he was thrown into the Bastille, but was released after a year and banished to his estates in Burgundy. The book has been many times republished and has been widely read. Besides this, he wrote many poems and fugitive pieces, and left two volumes of interesting memoirs, published in 1696, and a collection of letters published in 1697-1709.

**BUST** (Ital. *busto*; Fr. *buste*), in plastic art, the name given to a sculptural representation of the head and upper part of the human body. The earliest busts formed by the ancients were probably those heads of Mercury which, when elevated on tall square blocks of stone, received the name of *hermæ* (see **HERMES**). These were afterwards frequently surmounted by representations of other divinities, such as Minerva; and as they gradually assumed more and more of the human form, they passed into busts, which were made of marble, bronze, etc. But it was not till very late in the history of art that busts, in the sense of portraits of individuals, came to be used, either in Greece or Rome; and it is remarkable that neither Greeks nor Romans designated them by any special name, for the Latin word *bustum* had a quite different meaning. It was not till Alexander's time that busts were used for purposes of portraiture in Greece; and most of the Roman busts which we possess belong to the period of the emperors. During the learned period of Greece, which commenced with Aristotle, portraits of men of letters formed an important department of art; and it became an object with the founders of museums and libraries to procure complete sets of them. The artists of this period exhibited remarkable ability in expressing the characters of the individuals whom they represented. In this way we have well-authenticated busts of Socrates, Plato, Zeno the Stoic, and other philosophers; of poets and orators, such as Isocrates and Demosthenes; of Athenian statesmen and distinguished women. In Rome, representations of the kings, and persons of distinction belonging to the earlier period, were probably made from the *imagines majorem* which every patrician preserved in his atrium, and which were commonly made of wax. These, no doubt, were often merely fanciful representations, partly taken, it may be, from the more prominent features which belonged to the existing members of the family. The earliest well-authenticated Roman B. which we possess, is probably that of Scipio Africanus the elder. During the empire, busts for the most part were accurate portraits, and still furnish us with the means of becoming acquainted with the features, not only of the emperors themselves, but of most other persons of distinction. Busts of poets and men of letters are far less frequently met with amongst the Romans than amongst the Greeks. The chief marks of the authenticity in these busts



are the names which very frequently are inscribed on them, and, where these are not found, the comparison which we are enabled to make between them and coins. Private collectors of busts were not unknown in antiquity, as, for example, M. Terentius Varro and Pomponius Atticus. In our own time, king Louis I. of Bavaria made, in his celebrated Valhalla, the most remarkable collection of busts which perhaps anywhere exists. The first complete collection of engravings from antique busts was made by Fulvius Ursinius in his *Illustrium Imagines* (Rome, 1569, and Antwerp, 1606). Recently, we have been indebted to Visconti's *Iconographie Grecque* (Paris, 1811) and *Iconographie Romaine* (Paris, 1817) for a similar collection.

**BUSTAMANTE**, ANASTASIO, 1780-1851; a physician; b. Tlaxiupan, Mexico. He was among the earliest supporters of Iturbide when the revolt against Spain began in 1821. In 1830, he became vice-president of the republic, exercising the full power of president. He resigned when Santa Anna's revolution of 1832 became successful, and the next year was exiled, living in Europe until 1836, but recalled after the downfall of Santa Anna, and in 1837 elected president. In 1841 he resigned the presidency to Santa Anna, and in 1846 he was president of the Mexican congress.

**BUSTARD**, *Otis*, a genus of birds, sometimes made the type of a family, *otidae*, usually ranked in the order *grallae* (q.v.). The general structure seems to agree best with that of the *grallae*; but there are points of strong resemblance to gallinaceous birds, both in the appearance and habits of the bustards; while their power of running, and the use which they make of their wings to aid in running, are indicative of a relation to the *struthionidae*, or ostrich tribe. They differ, however, from these birds in possessing wings quite capable of flight, although even when pressed by danger they often seek to escape by running, and the great B. of Europe has been pursued and taken by greyhounds.—Bustards are birds of bulky form, with long neck and long naked legs; the toes, three in number, all directed forward, short, united at the base, and edged with membrane; the wings rather rounded; the bill of moderate length, straight, or nearly so. They are mostly inhabitants of open plains, to which all their habits are adapted.—The GREAT B. (*otis tarda*) was at one time plentiful in some parts of England, and was also an inhabitant of the s.e. of Scotland; but extending cultivation, and the persecution to which it has been subjected, have now rendered it a very rare British bird. It is common in the s. and e. of Europe, and abounds in the wide steppes of Tartary. It is the largest of European birds, the male sometimes weighing nearly 30 pounds. The female is much smaller than the male. The plumage is of a pale chestnut color on the upper parts, beautifully varied with black—much white and black on the wings, the tail tipped with white. The tail is short, spreading, and rounded. A tuft or plume about 7 in. long, springing from the chin, passes backwards and downwards on each side, in the summer dress of the male, partly concealing a long stripe of bare skin on each side of the neck. The anatomy of the male exhibits a remarkable peculiarity in a large bag or pouch, capable of holding several pints, the entrance to which is between the under-side of the tongue and the lower mandible. The use of this bag is unknown; but it has been conjectured to be for conveying water to the females and young, in wide, arid plains. The great B. feeds indiscriminately on animal and vegetable food, swallows frogs, mice, worms, etc., and is very fond of turnip-tops. Its flesh is highly esteemed for its flavor. It is polygamous. No difficulty is found in taming it, but all attempts to reduce it to a state of true domestication have hitherto failed, from its not breeding in the poultry-yard.—The LITTLE B. (*O. tetraz*), frequently in the s. of Europe and n. of Africa, is only an accidental visitant in Britain. It is not half the size of the great B.—The BLACK-HEADED B. (*O. nigriceps*) is found in large flocks in the open plains of the Mahratta country. Its flesh is esteemed one of the greatest delicacies in India.

**BUSTO-ARSI ZIO**, a t. of northern Italy, in the province of Milan, and 20 m. n.w. from Milan. It stands in a fertile plain, which produces much wine. Pop. about 9000.

**BUTADES** (wrongly called Dibutades), a Greek modeler in clay, described as the first who copied the human face in that material. Seeing on a wall a drawing in outline of his daughter's lover, B. molded the face of it in clay, and baked it with the tiles which it was his business to make. The incident led B. to ornament the ends of roof-tiles with faces, a practice largely imitated in after years. He lived about 600 B.C.

**BUTCHER-BIRD**. See SHRIKE.

**BUTCHER**, SAMUEL, D.D., 1811-76; ninetyeth bishop of Meath, Ireland; educated at Trinity college, Dublin, where he held professorships in ecclesiastical history and divinity. He was a prominent controversialist. His best known works are: *On the Present State of the Romish Controversy in Ireland*, 1855; *On the Relative Value of Human and Divine Knowledge*, 1857; *On the Conservative Character of the English Reformation*, 1862; and *Some Thoughts on the Supreme Authority of the Scriptures*, 1864.

**BUTCHER**, SAMUEL HENRY, LL.D., a British classicist born at Dublin (1850), educated at Marlborough College, Fellow of Trinity College, Cambridge (1874-76), Fellow of University College, Oxford (1876-82), and Professor of Greek at the University of Edinburgh

(1862). With Andrew Lang he has translated the *Odyssey* (1879) and written an account of Demosthenes (1881).

**BUTCHERS'-BROOM**, *Ruscus*, a genus of plants of the natural order *Liliaceae*, with male and female flowers on separate plants, a perianth of six leaves, filaments united, one style, and the fruit a berry. The common butchers'-broom (*R. aculeatus*) is a shrubby or almost shrubby evergreen plant, with a biennial stem, 1 to 3 ft. high, sending out many short branches and ovate alternate sharp-pointed false leaves of the same substance as the branches, the flowers minute and arising from the disk of the false leaves, solitary; the berries red, almost as large as wild-cherries, and of a sweetish taste. It is common in many parts of the s. of Europe, and in the s. of England in woods and hedges. The English name is derived from the use made of the plant by butchers, to sweep their blocks. It grows well under trees or shrubs, and can often be advantageously introduced for ornamental purposes. The root was formerly much used in medicine. It is aperient and diuretic.—*R. hypophyllum*, a native of Italy, had once a considerable reputation as a stimulant of the uterus.

**BUTE**, an island in the frith of Clyde, Scotland, separated from the coast of Argyll by a narrow winding strait, called the kyles of Bute, mostly under a mile wide, about 6 m. distant from the w. coast of Ayrshire, and 8 m. n. of Arran. It is about 16 m. long, of irregular breadth, and with an area of 60 sq. miles. The surface to the n. is high, rugged, and barren; in the center and s., it is low and undulating, and comparatively fertile. The highest point rises 875 feet. The coast is rocky and has some bays. The island has several small lakes. The climate is milder than in any other part of Scotland, and, though moist, less so than on the w. coast generally; hence, it is much resorted to by invalids. In the s. the soil is sandy; towards the n. clay predominates. Most of the land is under tillage, and agriculture is in a good state. The chief town is Rothesay. Most of the island belongs to the marquis of Bute, whose beautiful seat, Mount Stuart, is about 4 m. s. from Rothesay. Among the antiquities of B. are Rothesay castle, Kames castle, Kilmorie castle, St. Blaine's chapel, Dungyle, a remarkable vitrified fort on a high crag on the s.w. coast, and the Devil's caldron, a circular erection, the original purpose of which is not well known. B. and the neighboring isles were for many centuries subject to the Norwegians.

**BUTE**, JOHN PATRICK CRICHTON STUART, Marquis of, b. 1847. He joined the Roman Catholic church in 1868 and has published several religious works, besides various articles for reviews. In 1893 he was elected Rector of St. Andrews University.

**BUTE**, JOHN STUART, third earl of, was b. in 1713, and d. in 1792. About 1787, he attracted the favorable notice of Frederick, prince of Wales, who made him one of his lords of the bedchamber. After the death of the prince, he became Groom of the Stole to his son, afterwards George III., over whose mind he obtained a strong influence. In Mar., 1761, he was appointed one of the principal secretaries of state; and from the 29th May, 1762, to the 8th April, 1763, he was prime minister. His government is memorable only as one of the most unpopular that ever held office in Britain, its fundamental principle being the supremacy of the royal prerogative, of which the executive government were merely the humble servants. Lord Bute was given to scientific pursuits, especially botany, and showed himself a liberal patron of literature and art. He married the only daughter of lady Mary Wortley Montagu.

**BU'TEA**, a genus of plants of the natural order *leguminosae*, suborder *papilionaceae*, remarkable for the great length of the standard of the flower, and having a compressed, one-seeded pod, membranaceous at the apex. The best known species are *B. frondosa* and *B. superba*, natives of India; and the former very widely diffused throughout that country, generally appearing as a sort of shrub in the neighborhood of villages, but in the jungles growing into a small tree. These trees present a gorgeous sight when covered with racemes of large deep scarlet flowers. They have trifoliate leaves, with roundish leaflets, velvety beneath. They yield a resinous exudation, which occurs in the form of lurid red tears, often covering the twigs, and is one of the kinds of lac (q. v.) brought to the market in India. The juice of the tree is not red, and the lac is supposed to be elaborated by insects, but of what species is unknown. *B. frondosa* is called the *dhak* tree in India. The bark and roots are very fibrous, and the fiber is used for calking boats. The flowers, called *teesoo* or *keesoo*, yield a beautiful yellow or orange dye.

**BUTERA**, a t. of Sicily, in the province of Caltanissetta, and 8 m. n.n.w. from Terranova. It stands on a height on the left bank of the Manfria. Ruins of great antiquity exist in the neighborhood, but the ancient name is unknown. In 853, B. was besieged for five months by the Saracens, who raised the siege on the surrender of 6000 persons as slaves. B. was almost the last town in Sicily taken by the Normans, having held out against Count Roger till 1080. The present castle is of Norman erection, and contains a number of mediæval antiquities. Pop. 6000.

**BUTESHIRE**, a county in the s.w. of Scotland, comprising the isles of Bute (q. v.) and Arran (q. v.), and the Cumbræes, Holy isle, Pladda, Inchmarnoch, and other smaller islands. The area of the whole, according to the ordinance survey, is 225 sq. m., or 143,977 statute acres. The pop. in 1891 was 18,408. B. returns one member to parliament. The county town is Rothesay, in the island of Bute.

**BUTIN**, ULYSSE LOUIS AUGUSTE, 1838-83; b. Saint-Quentin, France; artist, pupil of Picot and Pils; worked very successfully with charcoal; painter of "The Departure" and "La Pêche," in Salon of 1877; also painter of "Saturday at Villerville—the Waiting," and many others. B. received medals in 1875 and 1878.

**BUTLER**, a co. in s. Alabama; 782 sq. m.; pop. '90, 21,641, includ. colored; hilly, and mostly covered with pine woods; produces corn, cotton, etc. The Louisville and Nashville railroad passes through. Co. seat, Greenville.

**BUTLER**, a co. in n.e. Iowa, on Cedar river and the Chicago Great Western railroad; 576 sq. m.; pop. '90, 15,463; an agricultural region, mostly prairie. Co. seat, Allison.

**BUTLER**, a co. in s. Kansas, on the White and Walnut rivers; 1428 sq. m.; pop. '90, 24,055. Agriculture is the chief business. Co. seat, Eldorado.

**BUTLER**, a co. in s.w. Kentucky, on Green river; 452 sq. m.; pop. '90, 13,956, incl. colored. Surface uneven, with moderately fertile soil; agriculture the main business. Co. seat, Morgantown.

**BUTLER**, a co. in s.e. Missouri, on the Arkansas border, w. of St. Francis river; 716 sq. m.; pop. '90, 9964, incl. colored. It has a level surface and fruitful soil, producing corn, tobacco, etc. Co. seat, Poplar Bluff.

**BUTLER**, a co. in e. Nebraska, s. of Platte river; 583 sq. m.; pop. '76, 4730; in '90, 15,454; productions agricultural. Co. seat, David City.

**BUTLER**, a co. in s.w. Ohio, on the Indiana border, intersected by Miami river, the Miami canal, and three railroads; 475 sq. m.; pop. '90, 48,597. Productions agricultural. Co. seat, Hamilton. There are in the co. many interesting monuments of aboriginal inhabitants.

**BUTLER**, a co. in w. Pennsylvania, near the Alleghany river, drained by the waters of the Beaver; 795 sq. m.; pop. '90, 55,839. The surface is diversified, and the soil sandy but tolerably good, producing the usual crops. Coal, iron, and limestone are plentiful. Co. seat, Butler.

**BUTLER**, a borough and co. seat of Butler co., Pa., on Conequenessing creek, 31 miles n. of Pittsburg, and entered by the Pennsylvania, the Pittsburg and Western, and the Pittsburg, Shenango and Lake Erie railroads. Its location in the oil region of the state gives it importance, and coal is mined here. There are several newspapers, glass-works, natural gas, flour-mills, manufactures of woollens and carriages, public high school, and national bank. Pop. 1880, 8163; 1890, 8734.

**BUTLER**, ALBAN; an English hagiologist, 1710-78. He was educated at the Douay Roman Catholic college, where he was professor of philosophy, and afterwards of divinity. He traveled on the continent, was chaplain to the duke of Norfolk, and president of the English college at St. Omer's, where he died. The *Lives of the Saints* was his great work. It has passed through many editions.

**BUTLER**, ANDREW PICKENS, 1796-1857; a graduate of South Carolina college, and lawyer of South Carolina. He was in the legislature in 1824, and in 1833 was appointed judge of sessions and afterwards of the supreme court. In 1846, he was chosen U. S. senator. It was Mr. Sumner's reply to B.'s last speech in the senate that led to the assault upon the Massachusetts senator by Preston S. Brooks.

**BUTLER**, BENJAMIN FRANKLIN, 1795-1858; a native of New York, and law partner of Martin Van Buren. He served in the legislature, and was a member of the commission to revise the statutes. In Jackson's cabinet he was attorney-general, 1833-38, and acting secretary of war, 1836-37. He was afterwards professor of law in the university of New York. He was a leading member of the Democratic party up to the time of the passage of the Kansas-Nebraska bill, after which he acted with the other party. See Mackenzie's *Life and Opinions of B. F. Butler*.

**BUTLER**, BENJAMIN FRANKLIN, lawyer, general, congressman, and governor of Massachusetts; was born at Deerfield, N. H., Nov. 5, 1818. His father, Captain John Butler, who had commanded a company of dragoons during the war of 1812, and had served under Gen. Jackson, died soon after his son's birth, and Mrs. Butler removed to Lowell, Mass. Benjamin Butler, after the usual schooling of the New England boy, entered Waterville College, Me., where he graduated in 1838. In 1840 he was admitted to the bar, at Lowell, and rapidly acquired a large practice in Lowell and other cities. He was early in politics as a member of the Democratic party, and by them was chosen to the legislature in 1853. In the same year he was a member of the constitutional convention, and in 1859 was elected to the state senate. On the first call for troops in the civil conflict (April 15, 1861), B., who was a brig. gen. of militia, called out his brigade. On the next day, the 6th regiment left Boston; and on the 18th, B., at the

head of the 8th regiment started for Washington by way of Baltimore. Two regiments of his brigade had in the mean time sailed for fortress Monroe, of which they took possession. The burning of railroad bridges prevented B. from reaching Washington directly, and he took possession of Annapolis and repaired the railroad from that city to Washington so speedily, that the 7th New York and the 8th Massachusetts regiments reached the capital in season to prevent any attempt at seizure. In May he took possession of Baltimore without opposition, and the same month was appointed maj. gen. and given command of fortress Monroe. Here he made the declaration, when requested to return runaway negroes, that the slaves were "contraband of war"—a doctrine that greatly discouraged the confederates and correspondingly elated the union side, for up to that period there had been no hesitation on the part of the civil or military authorities in doing their utmost to arrest and return fugitive slaves. In the spring of 1862 he commanded the land force of 18,000 men designed to co-operate with Farragut in command of the fleet to operate in the lower Mississippi, and on the 1st of May he took possession of New Orleans, where he remained until relieved by Gen. Banks, in December. His administration in New Orleans was violently denounced; but he kept order, forced the people to keep reasonably clean streets, and so avoided the yellow-fever for one season; compelled the rich confederates to contribute to the support of those whom the conflict had reduced to want, and enforced due respect for the flag of the nation. Near the close of 1863 he was put in command of the department of Virginia and North Carolina, and in May, 1864, occupied City Point and Bermuda Hundred in support of Grant's movement upon Petersburg. In October he was sent to New York to assure peace during the election, there being danger of serious trouble. In 1864 he was sent against Fort Fisher, but the enterprise failed, in consequence of a storm, and he returned, contrary to orders, for which he was relieved from command. In 1866 he was chosen member of congress from the Boston district, and in 1868, was one of the managers in the impeachment of President Johnson. From the breaking out of the civil war until 1876-77, Butler acted with the Republican party; but when the greenback and labor movement began to take shape he favored it, and in 1878 was the candidate of those parties, and of a large portion of the Democratic party, for governor of Massachusetts, receiving 109,435 votes to 184,725 for the successful Republican candidate. He was an unsuccessful candidate of "greenbackers," labor men, and Democrats, in 1879, formally announced himself a Democrat in the presidential campaign of 1880, and in 1882 was elected by that party gov. of Mass. He was one of the delegates to the Democratic national convention that nominated Grover Cleveland for the presidency, 1884; and was himself a candidate for the nomination. Professing dissatisfaction with the methods and result of that convention, he accepted the nominations tendered him by both the Anti-Monopoly and Greenback-Labor parties, which he united under the name of the People's party, and carried on a vigorous campaign, but polled a far smaller vote than was anticipated. Gen. Butler died suddenly on the 11th of January, 1893. See Parton, *General Butler in New Orleans* (1863); and *Butler's Book* (1892).

**BUTLER, CHARLES**, 1750-1832; a prolific English writer, nephew of Alban. He was educated at Douay, and entered at Lincoln inn in 1775, coming to the bar in 1791. His literary activity was enormous. Among his works were *Reminiscences*; *Horæ Biblicæ*; *Horæ Juridicæ Subsecivæ*; *Book of the Roman Catholic Church*; and lives of Erasmus, Grotius, and others. He also edited his uncle's *Lives of the Saints*, and completed an edition of *Coke upon Littleton*.

**BUTLER, CLEMENT MOORE**, D.D., b. N. Y., 1810-90; a Protestant Episcopal minister in Georgetown, D. C., Boston, and Washington; rector of Grace Church, Rome, Italy, 1862-64; professor of ecclesiastical history in the divinity school of the Protestant Episcopal church in West Philadelphia 1864-84. He published *The Book of Common Prayer Interpreted by its History*; *Old Truths and New Errors*; *St. Paul in Rome*; *Inner Rome*; *Manual of Ecclesiastical History from the 1st to the 18th Century*; *Sermons*, etc.

**BUTLER, ELIZABETH SOUTHERDEN**. See THOMPSON, ELIZABETH.

**BUTLER, JAMES**. See ORMOND.

**BUTLER, JAMES GLENTWORTH**, Presbyterian divine, b. in Brooklyn, N. Y., 1821, studied at Yale University and at Union and Yale Theological Seminaries. He is the author of an important commentary called *The Bible Work* (vol. I, 1878; vols. VII. and VIII., 1893) and of *The Fourfold Gospels* (1890).

**BUTLER, JOHN**, a native of Conn.: d. Canada, 1794: a tory leader in the revolution, commanding a regiment of militia. In 1776 he organized a band of guerillas disguised as Indians, who committed many outrages. He also commanded the men who destroyed Wyoming, Penn., 1778. After peace he settled in Canada, where he was agent for Indian affairs.

**BUTLER, JOSEPH**, one of the most eminent of English divines, was b. in 1692 at Wantage, in Berkshire, where his father kept a shop. With a view to the ministry of the Presbyterian church, he attended a dissenting academy at Tewkesbury, in Gloucestershire. At the age of 22, he gave proof of high metaphysical ability in a letter to Dr. Samuel Clarke, usually appended to that celebrated writer's *a-priori* demonstration, to which it offers some objections. About this time, he made up his mind to join the church of England, and in Mar., 1714, entered Oriel college, Oxford. Soon after, he

took orders. In 1718, he was appointed preacher at the Rolls chapel, where he preached those remarkable sermons which he published in 1736. The first three, *On Human Nature*, constitute one of the most important contributions ever made to moral science. The scope of the reasoning is briefly, that virtue is consonant with, and vice a violation of, man's nature. In 1725, B. was presented to the rich benefice of Stanhope, in the co. of Durham, to which he removed in the following year. Here he resided in great retirement till 1733. His friend Secker, the archbishop, desired to see him promoted to some more important position, and mentioned his name once to queen Caroline. The queen thought he had been dead, and asked archbishop Blackburne if it were not so. "No, madam," said the archbishop; "but he is buried." In 1733, B. became chaplain to his friend lord chancellor Talbot, and at the same time a prebendary of Rochester. In 1736, he published the great work of which the germs were contained in his three sermons, and which has entitled him, in the eyes of his eloquent disciple Chalmers, to be called "the Bacon of theology." The leading aim of the *Analogy* is to show, that all the objections to revealed religion are equally applicable to the whole constitution of nature, and that the general analogy between the principles of divine government, as revealed in the Scriptures, and those manifested in the course of nature, warrants the conclusion that they have one Author. Soon after the publication of this work, B. was appointed clerk of the closet to the queen, who greatly prized his conversation. In 1738, he was made bishop of Bristol; in 1740, dean of St. Paul's; and in 1750, he was translated to the see of Durham. He lived only to make one visitation of his diocese. His "charge" on the occasion, in which he pointed out, with characteristic depth of insight, the importance of a due maintenance of the externals of religion, as a means of keeping alive the thought of it in the minds of the people, subjected him to much censure as betraying a tendency to Roman Catholicism—a charge unworthy now of serious notice. B.'s private character was such as became a Christian prelate: grave and judicious, he was at the same time meek and generous. His intercourse with his clergy and people was frank and humane; his episcopal treasures were wisely and munificently distributed, as not his own; and no anxious legatee looked with hope to his death. That event took place at Bath, June 16, 1752, and the good bishop's remains were buried in Bristol cathedral. His works, with *Life* by Kippis, and notes by Halifax, were collected and published at Edinburgh (1804); reprinted at Oxford (1807), and subsequently. There are good separate editions of the *Analogy* and of the *Three Sermons*. See *Life* by Bartlett (1839).

**BUTLER, NICHOLAS MURRAY**, educator, was born in Ellizabeth, N. J., 1862. In 1882 he graduated with honors from Columbia College, receiving at once a fellowship. After spending some time abroad in study at Berlin and Paris, he returned to this country, becoming successively, at Columbia, assistant in philosophy, tutor (1886-89), adjunct professor (1889), professor of philosophy and Dean of the Faculty of Philosophy (1890). He became editor-in-chief of the *Educational Review* (1891). Dr. Butler is the author of a great many addresses, papers, essays, and reviews. In 1894 he was elected President of the National Educational Association.

**BUTLER, SAMUEL**, poet, was b. at Strensham, Worcestershire, in 1612. His father was a farmer in that place, and said to be a person of some education. Young B., after acquiring the rudiments of his education at home, was placed at the college school at Worcester. His progress there was rapid, and on leaving it he proceeded to one of the universities. After finishing his education, he was appointed clerk to T. Jeffreys, esq., justice of the peace, and in his leisure hours devoted himself to the study of music and poetry. He afterwards entered the household of the countess of Kent, which he left, and went to live with sir Samuel Luke, who resided in the same county. After the king's restoration, he was made secretary to the earl of Carberry, which office he held till 1661. About this time, B. married a Mrs. Herbert, a lady of good family and some property, which, however, was afterwards lost by being invested in bad securities. He published the first part of *Hudibras* in 1663, and its reception at court was immediate and triumphant. It received all the favor Charles could spare from his spaniels and his mistresses, and he deigned even to garnish his royal conversation with its wit. The courtiers took up the fashion, the coffee-houses and taverns followed suit, and finally the mob went into raptures, in imitation of its betters. *Hudibras* was pirated within four weeks of its publication. The king had wit enough to see the merit of the work, but he lacked generosity to relieve the necessities of the writer. There seems to be no good reason to believe that B.'s palm ever tingled to the touch of royal pension or gratuity. Poverty is almost the only thing in B.'s life that one is certain of. In 1664, he published the second part of his book, and a third part appeared in 1678. He died in Rose street, Covent garden, in 1680; and while some say that he starved from pride, all agree that at his death he was very poor.

*Hudibras* is a kind of metrical *Don Quixote*; and if the work of Cervantes stands at the head of its class in the literature of Spain, *Hudibras* occupies the same place in the literature of England. The Puritans are the subjects of B.'s derision, and king Charles must have felt that the poet avenged for him the battle of Worcester. The weight, compression, and plenteousness of the wit is wonderful. *Hudibras* is like a mass of crystals, every point flashes. It is, beyond any other book, of wit "all com-

pact." B. thinks in witty couplets, he argues in them, he spears his foes with a jest, he routs and chases them into oblivion with unextinguishable laughter. His best things have become proverbs. His mass of wit has been grated down into common speech, and particles may be found in the talk of English plowmen and artisans.

**BUTLER, WILLIAM ALLEN, LL.D.**; b. N. Y., 1825; a graduate of the university of New York, studied law with his father (Benjamin F., of New York), and traveled extensively abroad before commencing practice. He is the author of several popular satirical poems, among which are *Nothing to Wear*; *Barnum's Parnassus*; and *Two Millions*. He has also published *Lawyer and Client*, a biographical sketch of Martin Van Buren; *Domesticus* (1886); *Ober-Ammergau*, verse (1891); *Mrs. Limber's Raffle* (1894), etc.

**BUTLER, WILLIAM ORLANDO**, 1793-1880; b. Ky.; served in the Indian battles of 1812, and under Jackson at New Orleans, and after the war practiced law in Kentucky. He was a member of congress, 1839-43, and next year democratic candidate for governor; in 1848 the democratic nominee for vice-president, but not successful. He served as maj. gen. of volunteers in the war with Mexico, and was wounded at Monterey. He was a member of the peace congress of 1861. See *Life* by F. B. Blair, Jr.

**BUTLERAGE OF WINE**, as described by Blackstone and Stephen, is a very ancient hereditary duty belonging to the crown, and is otherwise called the *prisa* of wines. Under the right to levy it, the crown could take two tuns of wine from every ship (English or foreign) importing into England 20 tuns or more, one before and one behind the mast; which, by charter of Edward I., was exchanged into a duty of two shillings for every tun imported by merchant strangers, and called butlerage, because paid to the king's butler.

**BUTO**, an Egyptian goddess, deity of the town Buto in northern Egypt. She personified lower Egypt; and, it was believed, presided over fire, and resided in the sun. B. was considered to represent the Greek Latona, and to be the regent of certain districts and cities in Egypt and Arabia.

**BUTOMUS**, a genus of aquatic plants, of which one species, *B. umbellatus*, is frequent in ditches and ponds in many parts of Europe.

**BUTT, ISAAC**, b. 1818; graduate of Trinity college, Dublin, and a member of the Irish bar. He was one of the counsel for Smith O'Brien and others tried in 1848 for treason, and also for the Fenians tried in 1865. In 1853, he was chosen to parliament from Youghal as a liberal conservative; and in 1871 he was returned from Limerick as a "home ruler," and was for many years the chief leader and support of the idea which that name involves. He was one of the projectors, and for a time the editor, of the *Dublin University Magazine*. He also published *Literature of Political Economy*; *History of the Kingdom of Italy*, and works on the relations of landlord and tenant. He d. in 1879.

**BUTTE**, a small hill or knoll, or rising ground; in some places applied to mountains, as the Downieville Buttes in California, which are nearly 9000 feet high.

**BUTTE**, a co. in n. California, on the Sacramento and Feather rivers; 1720 sq. m.; pop. '90, 17,989. The surface is rough and well wooded, and the soil fertile. The co. is rich in gold, silver, platinum, cinnabar, lead, and iron. The Southern Pacific railroad crosses the w. portion. Wheat, barley, wine, and wool are the chief agricultural productions. Co. seat, Chico.

**BUTTE**, a western co. of S. Dakota, organized 1883; on the northern edge of the Black Hills, and the Fremont, Elkhorn, and Missouri Valley railroad; 2885 sq. m.; pop. '90, 1087. The soil is fertile; the principal industries are farming and stock-raising. Co. seat, Bellefourche.

**BUTTE**, city and co. seat of Silverbow co., Mont., on the s. slope of the Big Butte range of the Rocky mts., 108 m. s. by w. of Helena, and reached by the Union Pacific, Northern Pacific, Great Northern, Montana Union, and other railroads. It was laid out in 1864, but its prosperity dates from the successful operations in quartz mining in 1875. It is situated at an altitude of 5000 ft., is handsomely laid out, has water-works, cable and motor street-cars, a fire department, excellent schools, newspapers, a public library, and many churches, and is the seat of the great Anaconda mine. Pop. 1880, 3363; 1890, 10,723.

**BUTTER** (Ger. *Butter*; Fr. *beurre*; Lat. *butyrum*) is the fatty substance present in the milk of the mammalia, and capable of being extracted from it. In ancient times the Hebrews seem to have made copious use of butter as food; but the Greeks and the Romans used it only as an ointment in their baths, and it is probable that the Greeks obtained their knowledge of the substance from the Scythians, Thracians, and Phrygians, whilst the Romans obtained it from Germany. In southern Europe, at the present time, B. is very sparingly used; and in Italy, Spain, Portugal, and southern France, it is sold by apothecaries as a medicinal agent for external application. The amount of B. in cows' milk (q. v.) is about 4 per cent., though the kind of pasture, quantity of milk, and general condition, influence the relative quantity of the several ingredients of milk. In the extraction of B., the milk is allowed to cool, and the cream which rises to the surface is skimmed off, and put into a large, deep, earthenware vessel, where it lies for several days till enough has been collected for a *churning*. Any difference in the exact mode of treatment of the milk yields a B. with some peculiarity or other.

In order to separate B. from milk, recourse is always had to the process of agitation in churns (q.v.). The principle involved in each and all forms of this apparatus is the thorough agitation of the contents, so as to cause the rupture of the minute fat globules present in the milk, and the incorporation of these ruptured fat globules into larger or smaller masses of butter. The cream is strained through cloth into the churn, to remove any foreign matter; and the agitators being set in motion, the friction of the movement, combined with the admission of air, and the chemical changes it induces, raises the temperature of the whole contents. At one time, it was thought that one great object of the agitation was the admission of the oxygen of the air, which becoming thoroughly incorporated with constituents of the milk, combined therewith, and, as a consequence, led to the separation of the butter. It is found, however, that B. can be obtained from milk by mere agitation, without the admission of the oxygen of the air. At the same time, in the ordinary way of churning, oxygen does play a subordinate part by combining with the sugar of the milk, and forming lactic acid, which in its turn *sours* the milk, and separates therefrom the caseine (q.v.)—cheese-matter—in minute clots or flakes, yielding what is commonly called *sour* or *butter-milk*. The process of churning must be conducted at a medium rate. If too quickly performed the B. is soft and frothy, and is said to *burst*; whilst when too slowly made, it is highly tenacious, strong tasted, and badly flavored. When all the B. has *come*, which is known by the particles agglutinating into irregular masses, the B. is *made* by taking the lumps, and well washing and kneading them on a wooden board in a tub of pure spring-water till all the butter-milk has been expressed; it is then divided into the requisite size of lumps, fashioned into rolls, or molded into forms, and usually stamped with some device. In the making up of the B. the hands of the operator must be scrupulously clean, and be free from the slightest taint of soap. Persons who are subject to moist hands should never knead B., as it is very liable to be contaminated by the slightest foreign matter, especially animal secretions; and it is better always for the operator to wash the hands with water containing some oatmeal before commencing. So important is this source of contamination regarded in America, that every endeavor is made to get quit of manual labor in working the B., and a wooden *butter-worker* has been invented, and is largely used here. When newly prepared, the B. is called *fresh* or *sweet* B., and is of a yellow color, which is well known to be deeper as the pasture on which the cows have been fed is richer, and hence the poorer kinds of B. are often artificially colored with annatto (q.v.).

A large quantity of the B. sent into market has more or less common salt added, for the purpose of preserving it. For use within a week or two, the proportion of common salt employed is about  $\frac{1}{4}$  an oz. to 2 lbs. of B., though, where it has to be kept for some time, as much as 1 oz. of salt to 1 lb. of butter is used. The incorporation requires to be carefully and dexterously done, so that the resulting material may be uniform; and the better plan is to add only a portion of the salt at a time, and to knead and re-knead the B. till the whole is thoroughly mixed. When the less amount of salt has been employed, the result is *powdered* B., and the larger quantity yields *salt* butter. Much of the latter is closely packed in small wooden firkins or *kits*, and occasionally in stoneware, and sent into market. Great care must be taken to have these kits, and indeed to have every vessel used in the preparation, as clean or *sweet* as possible. Constant rinsings with cold water, and scaldings with boiling water, are resorted to. Attention must likewise be paid to the air of the apartments in which the operations are carried on, as a tainted air is very injurious. See *ILLUS.*, DAIRY, vol. IV.

The adulterations liable to be present in B. are an undue proportion of salt and water, and these run up occasionally to upwards of 83 per cent, or one third of the total weight. Another adulteration is the presence of lactate of zinc, derived from the milk being placed in zinc pails and basins, from the impression that by some imaginary electrical influence an increase in the amount of cream will be the result; but though this is not attained, yet the milk tending to form lactic acid, the latter attacks the zinc vessel, and forms lactate of zinc, which dissolves in the milk, and thereby contaminates it, imparting an unpleasant taste, and, when present in larger quantity, leading to violent spasmodic vomiting. When B. is allowed to get old, it becomes rancid and tastes and smells disagreeably. To some extent an acid is formed, called butyric acid (q.v.). For the use of B. in diet, see *FOOD* and *NUTRITION*.

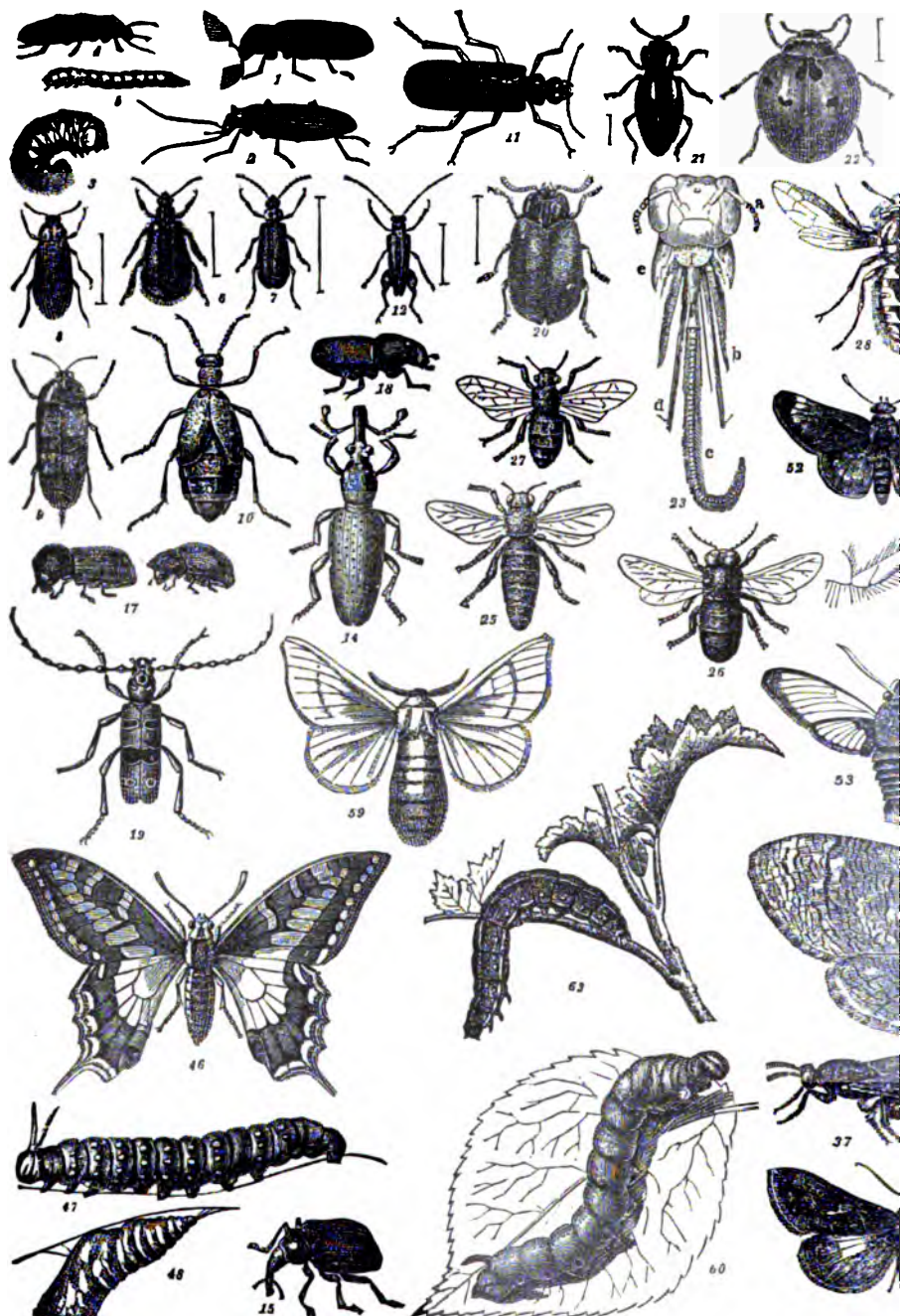
BUTTER, in chemistry, is often applied generically to any substance of the same consistence of B., and is therefore used to designate palm, cocoa-nut, shea, and nutmeg oils. It is also applied to certain metallic substances which have an oily aspect and consistence resembling melted B.; thus we have B. of antimony, bismuth, zinc, and tin.—BUTTER of antimony is a thick, dense, oily compound, produced by acting upon the native sulphuret of antimony,  $SbS_3$ , by concentrated hydrochloric acid,  $HCl$ , and heat, when the oily chloride of antimony,  $SbCl_3$ , is formed. See *ANTIMONY*.

BUTTERINE, or OLEOMARGARINE (q.v.), a substitute for B., was first manufactured in France, but is now extensively produced in other countries, particularly in America. Its sale under the name of Butterine was prohibited in Great Britain in 1887. See *DAIRY*. It is composed of animal fat, amalgamated with milk, to which is sometimes added a small proportion of real butter.

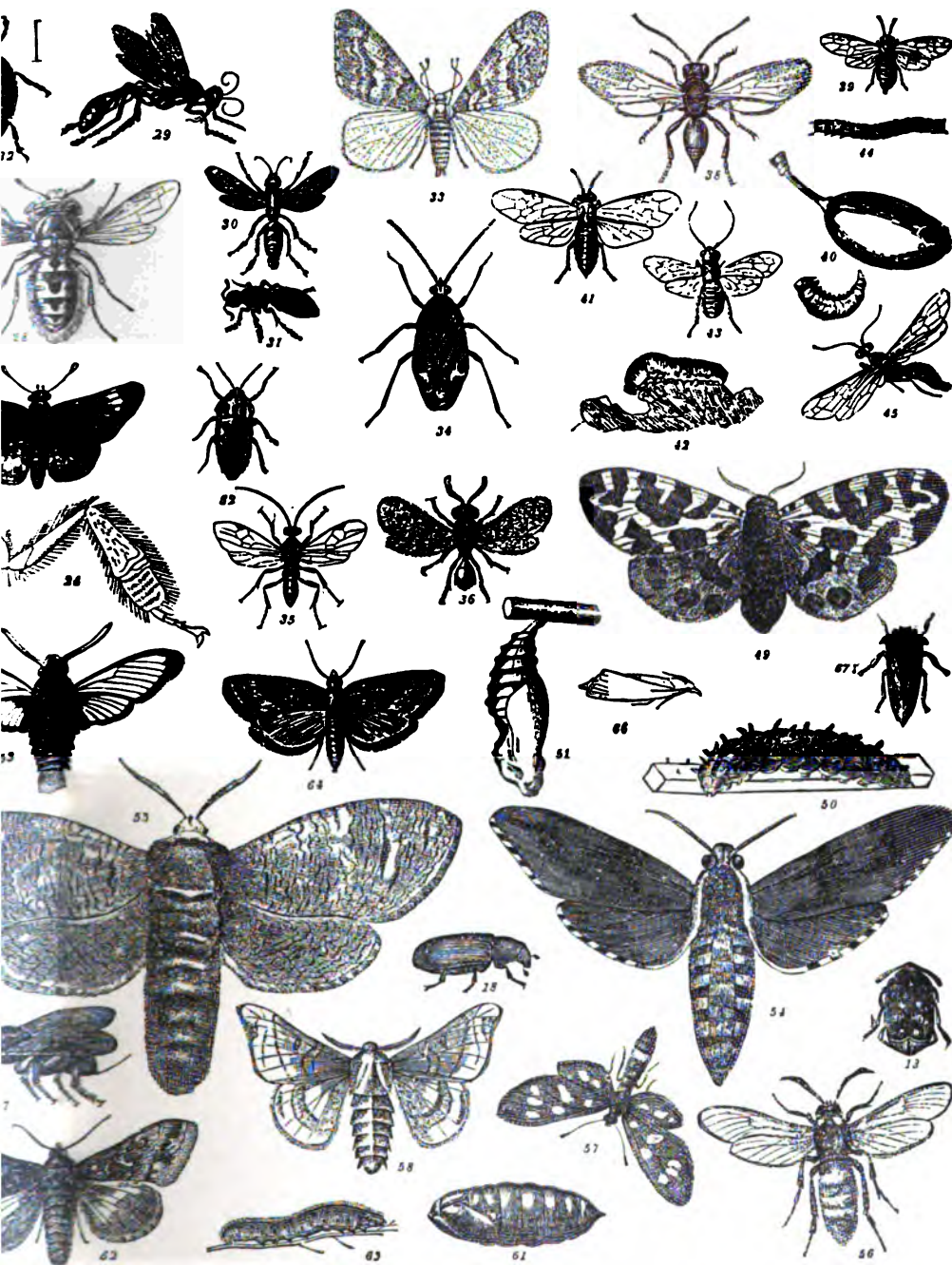
BUTTER, Rock, a mineral which may be regarded as a variety of alum (q.v.)—an iron alum, appearing as a pasty exudation from rocks that contain alum or its constituents.







**BUTTERFLIES, BEETLES, ETC.**—1. Pectinate borer. 2. Fiddler. 3. Larva of same. 9. Hispa. 10. Oil-beetle. 11. Spanish-fly. 12. Ordemerus. 13. Pea-beetle. 19. Capricorn beetle. 20. Leaf-bug. 21. Tenebrio. 22. Lady-bug. 23. Bee-eat. 29. Sand-wasp. 30. Day-wasp. 31. Spider-ant. 32. Cockchafer. 33. Geome. 38. Rose-gall fly. 39. Plum-wasp. 40. Larva of same. 41. Rape-plant wasp. 47. Larva of same. 48. Pupa of same. 49. Bear-moth. 50. Larva of Admiral t. weevil. 56. Hornet. 57. White-spot. 58. Silk worm, male: 59. female. 60. C of same. 66. Honey-moth. 67. Froth-fly.



me. 4. Meal-worm. 5. Larva of same. 6. Woolly beetle. 7. Scarlet beetle. 8. Melandria.  
le. 14. Corn-weevil. 15. Vine-weevil. 16. Clover-bug. 17. Bark-weevil. 18. Plum-tree weevil.  
-eater. 24. Hind-legs of working-bee. 25. Honey-bee queen; 26. drone; 27. worker. 28. Wasp.  
ometra brumata. 34. Blind-beetle. 35. Little-bellied wasp. 36. Buzz-wasp. 37. Glow-worm.  
sp. 42. Larva of same. 43. Pear wasp. 44. Larva of same. 45. Grain-wasp. 46. Swallow-tail.  
ral butterfly. 51. Pupa of same. 52. Big-head. 53. Glass-moth. 54. Cone-moth. 55. Willow-  
yo. Caterpillar. 61. Pupa. 62. Plusia gemma. 63. Cabbage-worm. 64. Grape insect. 65. Larva



particularly alum-slate and other schistose rocks. It occurs at Hurlet alum-work, near Paisley, Scotland, and in a number of places on the continent of Europe. It is not unlike *B.* in color, varying from yellowish white to sulphur yellow. It is rather greasy to the touch, and is easily broken in pieces.

**BUTTERCUP.** See *RANUNCULUS*.

**BUTTERFIELD, DANIEL**, U. S. military officer, b. in 1881, educated at Union College, led a regiment of volunteers at the outbreak of the civil war and took part in many actions, rising to the brevet rank of major-general in the regular army. He resigned in 1869, became sub-treasurer of the U. S. in New York, and afterwards went into the express business.

**BUTTERFIELD, JOHN**, 1788-1869; one of the founders of the express business in the United States. Before the time of railroads he was proprietor of many important lines of stage coaches, especially in New York state.

**BUTTERFISH.** See *GUNNEL*.

**BUTTERFLY**, the common name of all the diurnal lepidopterous insects (see *LEPIDOPTERA*), corresponding with the genus *papilio*, as originally defined by Linnæus, but forming many genera in the most recent entomological systems. Butterflies exhibit a great similarity in almost all respects to other lepidopterous insects, the common characters of which will be found in the article on that order; but are distinguished even more than the rest of them generally, by brilliancy of coloring, which in butterflies also belongs to the under as well as the upper side of the wings, whilst the beauty of moths and hawk-moths appears chiefly on the upper side. Accordant with this circumstance, is the further peculiarity, that almost all butterflies, when at rest, usually hold their wings erect, the under side being thus chiefly exhibited; whilst the other lepidopterous insects, when at rest, hold their wings in a horizontal or somewhat inclined position, and some have them wrapped round the body. Butterflies are also the only lepidopterous insects which have no spines, bristles, or hooks on the margins of their wings, by which the second wing on each side can be attached to the first, but both when flying and at rest, have all their wings quite separate. The manner in which the scales of the wings are imbricated, gives those of butterflies a smoother appearance than those of moths and hawk-moths. The antennæ of butterflies are generally simple, slender, and elongated, and terminated by a little club. Their caterpillars have always sixteen feet (see *CATERPILLAR*). The pupa or chrysalis is angular; is seldom enveloped in a cocoon; is generally suspended by the tail, by means of a silky substance, often to a leaf or twig, but is sometimes supported by bands around the middle; and generally exhibits more or less of that golden coloring from which both the names *aurelia* (Lat. *aurum*) and *chrysalis* (Gr. *chrysoe*) are derived.

Butterflies are found in all parts of the world; they are to be seen during the sunshine of the brief summer extracting nectar from the flowers even of Greenland and Spitzbergen, but they are most numerous in the warmest regions; where, however, many of them live chiefly in the shade of moist foliage, in woods and jungles. Dr. Hooker, describing the scenery on the banks of the Great Runjeet in the Sikkin Himalaya, says that "by far the most striking feature consisted in the amazing quantity of superb butterflies, large tropical swallow-tails, black, with scarlet or yellow eyes on their wings. They were seen everywhere, sailing majestically through the still hot air, or fluttering from one scorching rock to another, and especially loving to settle on the damp sand of the river edge, where they sat by thousands, with erect wings, balancing themselves with a rocking motion, as their heavy sails inclined them to one side or the other, resembling a crowded fleet of yachts on a calm day."

Butterflies possess no small power of wing; some of them, indeed, of which the wings are comparatively thin and delicate, are inferior in this respect, and have a sort of zigzag flight; but others soar in the air with a steady and continuous motion. Short-lived as they are all generally believed to be, some of the tropical species perform wonderful migrations; concerning which, however, nothing but the fact is yet well known. "Frequently," says sir James Emerson Tennent in his work on *Ceylon*, "the extraordinary sight presents itself of flights of these delicate creatures, generally of a white or pale yellow hue, apparently miles in breadth, and of such prodigious extension as to occupy hours and even days uninterruptedly in their passage, whence coming no one knows, whither going no one can tell."

The number of species of *B.* is very great, and the arrangement of them has been found difficult, chiefly upon account of the great similarity in all important respects which prevails among them all. They are divided, however, into two well-marked sections, of which the first is characterized by having only a single pair of spurs or spines on the *tibiae* (or fourth joints of the legs), placed at their lower extremity; whilst in the other section, the *tibiae* of the hinder legs have two pair of spurs, one pair at each extremity. This distinction, seemingly unimportant in itself, is accompanied by other differences. The second section of butterflies may be regarded as forming a sort of connecting link between butterflies and hawk-moths. A few British species belong to it, but the species are generally tropical, and some of them, found in tropical America, are remarkable for their rapidity and power of flight, and for the migrations which they perform, besides being amongst "the most splendid insects in creation," a resplendent green, inimitable by art, relieving the velvet black of their wings, and varying with

every change of light. The beautiful iridescence of the wings of these and many other butterflies is owing to the peculiar position of the scales.

Some groups of butterflies are remarkable for the imperfect development of the first pair of legs, so that they are generally described as having four legs instead of six.

The eggs of butterflies are deposited on the plants, the leaves of which are to supply the food of the caterpillars. In cold and temperate climates, the eggs deposited in autumn are not hatched till the following spring; but it is believed that many species produce several broods in a year, as the eggs in summer may be hatched in a few days. The caterpillars of each species are generally confined to some particular kind of plant, the leaves of which they devour; their ravages are well known, but the excessive increase of their numbers is in part restrained by many enemies, and by none more than by the ichneumons (q. v.) and other insects, which deposit their eggs in them, and the larvæ of which feed on them. An account of the transformations of B. will be given under INSECT.

Butterflies vary in size from less than an inch to almost a foot across the expanded wings. The largest species are tropical. Some of the species are very widely distributed: *Cynthia cardui*, of which the caterpillar feeds on the leaves of thistles, is found not only throughout Europe, but in Egypt, Barbary, Senegal, Cape Colony, Madagascar, China, Java, Australia, Brazil, and North America, being, in fact, one of the most widely distributed of all insects. The geographical limits of other species appear to be very restricted. The diversity of coloring is almost endless, but a prevalence of certain hues, or of certain modes of the disposal of them, is observable throughout large groups. The caterpillars of many species are variously furnished with spines, those of others—some of them American—have long fleshy prominences, horny at the tip, probably intended as means of defense. The hinder wings of many butterflies are curiously prolonged into tail-like appendages, one or more on each wing, which vary in form, being sometimes long and linear, sometimes broad, and widening towards the extremity. These are seen in several American species.

Butterflies are chiefly known to us as objects of admiration and of pleasing contemplation, enhancing the charms of the most delightful weather, and always associated with the most lovely scenes, or—it must be added—as a cause of annoyance and vexation by the ravages of their caterpillar young in our fields and gardens. There is, however, one small species (*euplexa humata*) which affords a supply of food to some of the wretched aborigines of Australia. Butterflies of this species congregate in such vast numbers on the masses of granite in the mountains, that they are collected by simply making smothered fires under the rocks, in the smoke of which they are suffocated. Bushels of them are thus procured, and they are baked by placing them on the heated ground, the down and wings removed, and the bodies made into cakes which resemble lumps of fat. The months of Nov., Dec., and Jan. are quite a season of festivity from the abundance of this food.

Brief notices of a few of the principal kinds of B. will be found in other parts of this work. See CABBAGE BUTTERFLY; for typical form, CAMBERWELL BEAUTY, PURPLE EMPEROR, ETC. See illus., ANTELOPES, ETC., vol. I.; for LARVA, see adjoining illus., fig. 50.

✓ BUTTERFLY FISH. See BLENNY.

**BUTTERFLY WEED**, or **PLEURISY ROOT**, *Asclepias tuberosa*, see ASCLEPIAS; a plant found in all parts of the United States, and which has obtained a considerable reputation for the medicinal virtues of its root. The root is large, formed of irregular tubers or spindle-shaped branches, externally yellowish brown, internally white, with a somewhat acrid nauseous taste when recent, merely bitter when dried. It yields its properties to boiling water, and is usually administered in the form of a decoction, sometimes in that of a powder. It is diaphoretic and expectorant, and has been found useful in the commencement of pulmonary affections, in rheumatism, and in dysentery.—The stem of the plant is erect and hairy; the flowers orange-yellow.

**BUTTERMILK** is the form of milk from which the butter or oily matter has been abstracted. See BUTTER. B. contains the caseine, sugar, and salts of ordinary milk, and is only deficient in oily matters. It is therefore nutritious, and is largely used in Ireland and Scotland as an article of food, being very generally partaken of with porridge and with potatoes. It may be drunk *ad libitum*, is a very agreeable, cooling beverage, and is therefore useful in certain febrile and inflammatory conditions.

**BUTTERMILK FALLS**, in Le Roy, Genesee co., N. Y., on Oatka creek, which falls over a limestone ledge 90 feet high. The same name is given to a cascade in Bog Meadow creek, near West Point, N. Y.

**BUTTERNUT**, or **WHITE WALNUT**, *Juglans cinerea*, a large, wide-spreading American tree, with nearly smooth bark, and large leaves. The nuts are well-known, and form agreeable food when dried; when taken green and pickled they are prized for the table. Sugar can be made from the sap, but it is much inferior to that made from maple. The timber is useful for coach and cabinet work, posts, rails, and wooden bowls.

**BUTTER TREE**, a name given to several tropical trees, of different natural orders, the fruits of which yield concrete fixed oils, having the appearance and used for the pur



poes of butter. The B. trees of India and Africa belong to the genus *bassia* (q.v.) of the natural order *sapotaceae*; the B. trees of Guiana and Brazil to the genus *caryocar* (q.v.), of the natural order *rhizophoraceae*. The oil-palms (q.v.), and the *cocos butyracea* (see COCOA NUT), may also be regarded as B. trees, although not generally receiving that name.

**BUTTERWORT**, *Pinguicula*, a genus of plants of the natural order *lentibulariaceae* (q.v.), distinguished by a two-lipped calyx, the upper lip trifid, the lower bifid; a spurred corolla, two-lipped and gaping, the upper lip arched; and a globose germen. The species are small plants with only radical leaves, found in the bogs and marshes of different quarters of the world. Some of them possess much beauty when in flower, particularly *P. grandiflora*, a rare native of the s. of France and of Ireland. The common B. (*P. vulgaris*) is abundant in the northern parts of Britain and of Europe. It has the power of coagulating milk. The Laplanders pour reindeer milk, warm from the animal, upon the leaves of this plant, instantly strain it, and set it aside for two or three days, till it acquires the consistence of cream, and some degree of acidity, when it is with them a favorite article of food. A little of it in this state will produce the same effect on warm reindeer milk which was at first produced by the leaves of the plant. The origin of the English name B. is sometimes referred to the power of coagulating milk, sometimes to the peculiar sliminess of the leaves.

**BUTTERWORTH**, HEZEKIAH, b. Warren, R. I., 1839; received a common-school education; taught schoc. and edited a local paper in his native town. In 1870 he became assistant editor of the *Youth's Companion*, and has written much for periodicals, besides publishing *The Story of the Hymns* (1875); a number of volumes of travel for children, entitled *Zigzag Journeys*, beginning in 1879; *The Story of the Notable Prayers of Christian History* (1880); *Young Folks' History of America* (1881); *Young Folks' History of Boston* (1881); *Poems for Christmas, Easter, and New Year* (1884); *Songs of History* (1887); *The Log School-House on the Columbia* (1891); *The Boyhood of Lincoln* and *Little Arthur's History of Rome* (1892); *The Boys of Greenway Court* (1893); *The Patriot Schoolmaster* and *The Parson's Miracle* (1894); *The Knight of Liberty* and *In Old New-England* (1895), etc.; also the cantatas *Under the Palms* and *David, the Shepherd Boy*.

**BUTTMANN**, PHILIPP KARL, one of the most distinguished philologists of modern times, was b. at Frankfort-on-the-Main in 1764, and studied at Göttingen under Heyne. He became, in 1789, assistant in the royal library in Berlin, and rose successively to be secretary and librarian (1811). He held at the same time (1800-8) a professorship in the Joachimsthal gymnasium in Berlin, which he afterwards exchanged for a professorship in the newly founded university of that city. He died 21st June, 1829. B. is best known by his Greek grammars, the *Griech. Grammatik* (Berl. 1792; 21st ed. by his son, Alexander Buttmann, 1863), and an abridgment of it, *Griech. Schulgramm.* (14th ed. 1862); both have been translated into English. His *Lexilogus* (translated by Fishlake) and *Ausführliche Griech. Sprachlehre*, or larger Greek grammar, which have gone through several editions, are designed for scholars. In his *Mythologus*, he has collected his essays on the myths of the ancients.

**BUTTON.** The term B. is applied to the well-known appendages to dress used for fastening or for ornament; and to a sort of oblong latch moving upon a pivot in the middle, used by joiners and cabinet-makers for fastening the lids of boxes, doors of presses, etc. The mass of fused metal found at the bottom of a crucible or cupel, after fusing or assaying, is also technically called a button.

The history of button-making is in many ways a curious one. Dating no further back as a trade of any importance than the reign of Elizabeth, it has undergone several extraordinary changes, produced chiefly by the ever-varying fashions in dress, but also by some simple, though ingenious inventions, as well as by foreign competition. In Great Britain, Birmingham has always been the principal seat of the button manufacture. What has been called the "Augustan age" of button-making in that city included the latter portion of last and the early part of the present century, when even tradesmen wore coats "loaded with innumerable gilt buttons," and when employers on a moderate scale in this manufacture were making incomes of from £2000 to £3000 a year, and their workmen from £3 to £4 per week. Early in the present century, Mr. B. Sanders introduced the cloth-covered button, which initiated the change from those made of metal, and by which he rapidly made a fortune. His son, in 1825, effected the apparently trivial but really ingenious improvement of making it with a canvas tuft instead of a metal shank, by which both the button-holes and the garment itself were less subject to injury. This kind of button had an enormous sale, and is still much used. A further alteration was made on it by Mr. W. Elliott, who patented, in 1837, a mode of covering the button with silk; and in 1841 the linen button was introduced.

Turning now to other materials which have had a great "success" in their day, we find that buttons made of hoof, under the name of "horn buttons," as introduced nearly 40 years ago by Mona. E. Bassot of Paris, were for a good many years most extensively manufactured at Birmingham, and sent to all parts of the world. In hoof buttons the trade is now comparatively insignificant, and the French makers possess the market for what of it remains. Tweed clothing and fabrics in imitation of it have, through the

necessity of matching their various colors, led to the buttons for them being made of a rather uncommon material, namely, vegetable ivory (q.v.). This substance, which is the fruit of a palm, somewhat resembles true ivory, but is rather softer. It can be readily turned in the lathe, and dyed of various colors. More than 1000 tons of it, valued at from £25 to £30 per ton, are weekly consumed in Birmingham in making buttons, and it is also largely used for the same purpose in France, Germany, and the U. S.

What we have hitherto said refers principally to what manufacturers call the revolutions of the trade; but there are other important branches which have been less subject to change, chief among these being the so-called "pearl buttons"—that is, buttons made of mother-of-pearl shells. This has long been a leading branch, and employs a greater number hands than any other. Metal buttons, too, although not relatively so important as formerly, have never ceased to form a prominent section of the trade. They are a numerous class, and include all sorts for uniforms, trouser buttons, fancy buttons which are gilt, stamped, chased, or enameled, and many cheap varieties in iron and other metals for export. Numerous kinds of composite buttons are also partly composed of metal. Glass buttons form another interesting branch, carried on to a considerable extent in Birmingham, but more largely in Bohemia and Paris; so also do porcelain buttons, which, although an English invention, are now almost exclusively made in France. Vulcanite buttons have been very extensively made in the United States. As to other materials, a Birmingham manufacturer says it were easy to write out a long list from which buttons have been made, but very difficult to name one from which they have *not* been made.

We shall now describe briefly some of the processes in button-making, beginning with metal buttons. Circular disks, called "blanks," are first cut out of sheet brass or other metal by means of fly-presses, usually worked by girls. The fly-press consists of a vertical iron screw with a triple thread, to which screw is attached a horizontal arm, bending downwards at the end to form a handle. A punch attached to the press rises and falls with the motion of this handle, and rapidly cuts out the blanks. When large quantities of one pattern are required, a self-feeding, self-acting machine is used, which cuts out the blanks in rows at one blow, turning them out at the rate of 2000 gross per day. After being annealed, the blanks are next made convex by a blow from a stamp. The shanks are formed of wire by a separate machine, which cuts off pieces, and bends them into loops of the required form. When these are soldered on, the buttons are dressed on a lathe. They are then gilded and burnished; some, however, are only lackered; and some, though gilt, are finished in a dead or frosted style.—"Shell" buttons are those with a convex face, a flat or convex back, and hollow. These are made of two blanks, that forming the face being larger than the back to which the shank is attached. These blanks are pressed into the required shape by dies worked in the fly-press, and then, by another die, the edge of the larger blank is lapped over the smaller, and thus attached without soldering. Livery and other buttons having a device in strong relief are stamped by a die placed in a stamping-press. See **STAMPING OF METALS**.

In making covered buttons, a metal blank is punched, and its edge is turned up by a die in a fly-press; then a smaller metal blank is punched with a hole in the middle, and of such size, that, when flat, it shall fit into the upturned edge of the first: this perforated blank, or *collet*, is next pressed into a concave or dish-shaped. Two cloth blanks—the face one of silk, and the other for the tuft of thin canvas—are now punched, one considerably larger than the front metal blank, the other somewhat smaller; the larger cloth blank is laid upon the flat face of the metal blank, which is filled with a disk of mill-board or paper, and its edges turned over; these edges are covered by the smaller cloth, and then the collet laid upon them with its concavity towards the cloth. They are now all pressed together in a sort of die or mold, by which means the collet is flattened and spread out, while the upturned edge of the metal blank is turned forcibly over it, thus securing the collet, and with it the cloth which is strained tightly on the face, and its edges bound between the blank and the collet, so that the whole is firmly held together. The linen-covered button for underclothing, above referred to, is formed of a single brass ring with a groove or canal on one face. Into this the edges of the two round linen blanks are placed, so that when the edges of the groove are pressed firmly down, the button is entirely covered with linen.

Buttons with holes, technically called "four-holes," "three-holes," and "two-holes," when of pearl-shell, wood, bone, or ivory, are cut with a tubular saw, turned separately in a lathe, and drilled. When of metal, the blanks are punched, then stamped in dies to the required form; the holes are punched, and "rymered," to round the sharp edges that would otherwise cut the thread.—Glass buttons are most largely made by taking a rod of glass of any color, softening the end by heat, and pressing it into a mold, each half of which is fixed to one limb of a pair of pincers. The shank is placed into a hole in the mold before the melted glass is inserted.

The manufacture of pearl buttons was introduced into the United States about 1855. The raw material comes from the China seas and enters our ports free. Chinese snail shells command as high a price as 27 cents each. The common lathe is the only machine used, and no improvement in the process of manufacture has as yet been made. In the United States the lathes are operated by steam power, but in Bohemia and elsewhere, the work is done in families and by the poorer classes. The lathe is operated

by the feet and the hands are left free to manipulate the material. In Austria, France, and Germany much of the manufacturing is done by convicts.

About 7000 persons are employed in Birmingham, London, and elsewhere in Great Britain, in the manufacture of buttons, and a large proportion are women. In 1869 (before the war with Germany), about 20,000 persons were employed in France, showing how much more largely the button industry has been developed in that country. Germany is a still greater producer, the cheaper kinds of fancy buttons made in the Rhenish provinces of Prussia, the glass buttons of Bohemia, and the pearl buttons of Vienna being more extensively exported than those of any other country. The largest button manufactories in the United States are at Northampton, Mass., and Waterbury, Conn., New York, and Newark; Philadelphia, Providence, and Lynn, Mass., are also important centres of this industry. Nearly 10,000 persons are employed in the production of buttons in the entire country. The silver filigree buttons worn on dresses in Norway and Iceland, and the Japanese buttons, or *netrukies*, often possess a high degree of artistic excellence.

**BUTTON**, Sir THOMAS, the successor of sir Henry Hudson in the exploration of the n.e. coast of America. In 1612-13, he was frozen in and wintered on the w. coast of Hudson's bay. The next summer he explored all the coasts of the bay, returning to England in the autumn. He d. in 1634.

**BUTTON'S COFFEE HOUSE**, in Russell street, Covent Garden, London, was a famous place of assemblage for wits in Addison's time.

**BUTTONWOOD**. See PLANE.

**BUTTRESS** (old Eng. *bottes*; Fr. *butée*), a projection for the purpose of giving additional support or strength to a wall. In the classical style, there were no buttresses, their place being, to a certain extent, supplied by pilasters, antæ, etc. The different stages of Gothic architecture are marked by the form of buttresses employed, almost as distinctly as by the form of the arch. The Norman B. was broad, often semicircular, sometimes dieing into the wall at the top, and never projecting from it to any great extent. Early English buttresses project much more boldly, and are considerably narrower, than the Norman. They are frequently broken into stages, which diminish in size as they ascend. In the decorated style, this division into stages is almost invariable, the B. being often supplied with niches terminating in pinnacles, and very highly ornamented with carving, statues, etc. In the perpendicular style, they retain the forms which had been introduced during the decorated period, the ornamentation, of course, being varied to suit the character of the style. **FLYING BUTTRESSES**—i.e., buttresses in the form of a sloping arch, connecting the upper and central portions of an arched structure with the vertical buttresses of the outer walls—were introduced into England at the period of the early English, though they existed on the continent previously, where they continued to be used to a greater extent. They were also very common in Scotland. In England, they are generally called arch-buttresses.

**BUTTS**, a co. in central Georgia, on the Ockmulgee; 204 sq.m.; pop. '90, 10,565, incl. colored. The surface is uneven, and soil fertile. Productions, corn, cotton, and sweet potatoes. Co. seat, Jackson.

**BUTUA ROOT**. See CISSAMPELOS.

**BUTYRIC ACID** may be best obtained by saponifying butter with potash, then adding dilute sulphuric acid till an acid reaction is attained, and distilling about one half of the mixture, adding a little water, and continuing the distillation till the residue is not acid. B. A. may also be obtained by allowing a small quantity of milk-curd to act upon a solution of sugar at a temperature of 77° to 86° F., which excites a peculiar process of fermentation resulting in the formation of butyric acid. Some chalk is added to take up the B. A. whenever produced, and the better proportions to employ are 100 sugar, 8 to 10 fresh curd, and 50 chalk, with sufficient water to make a thin liquid. The butyrate of lime is left in the vessel, and on acting upon that by dilute hydrochloric or sulphuric acid, and redistilling, the free B. A. passes over in vapor, and is condensed. B. A. is a transparent, thin, oily liquid, with a most persistent rancid odor. It is mixable in all proportions in water, alcohol, ether, and oil of vitriol; has the specific gravity 973 (water being 1000), boils at 325.4° F. (163° C.); though it volatilizes at ordinary temperatures, as appears from the rancid odor of its vapor. Its chemical symbol is  $C_3H_7 \cdot CO \cdot OH$ , and it combines with bases, such as lime, soda, etc., to form salts.

**BUTYRIC ETHER**, or **PINE-APPLE OIL**, is an exceedingly fragrant oil obtained by distilling butyric acid (or the butyrate of lime), alcohol, and sulphuric acid. The material which passes over is the B. E., and it is generally mixed with alcohol, and sold in commerce as *artificial pine-apple oil*. It possesses the same very pleasant flavor which belongs to pine-apples, and there is little doubt that pine-apples owe their flavor to the presence of natural butyric ether. The artificial variety is now extensively used for flavoring confections, as pine-apple drops, for sophisticating bad rum, and for flavoring custards, ices, and creams, as also an acidulated drink or lemonade named pine-apple ale. B. E. alone cannot be used in perfumery for handkerchief use, as, when inhaled in even small quantity, it tends to cause irritation of the air-tubes of the lungs and intense headache, but it is employed as one material in the manufacture of compound perfumes.



It is composed of ordinary alcohol,  $C_2H_5OH$ , and butyric acid,  $C_3H_7 \cdot CO \cdot OH$ , and its strict chemical name and symbol is ethyl butyrate,  $C_3H_7 \cdot CO \cdot OC_2H_5$ . It is remarkable that a substance possessing such a disagreeable odor as butyric acid (that of rancid butter) should be capable of forming, in part at least, a substance with such a pleasant flavor as artificial pine-apple oil.

**BUXAR'**, a t. of Shahabad, in Bahar, presidency of Bengal, situated on the right bank of the Ganges. It is chiefly remarkable as the scene of a victory gained in 1764 by sir Hector Munro. At the head of 7072 men, of whom only 857 were Europeans, he defeated a native army of 40,000, and captured 183 guns. B. is 62 m. n.e. of Benares, and 898 n.w. of Calcutta.

**BUXBAMIA**, a genus of mosses, of which only one species is known, *B. aphylla*, a very rare British plant, remarkable for its apparent want of leaves; the whole plant above ground seeming to consist of a little conical bulb, with minute scales, which are, however, really its leaves.

**BUXTON**, a t. in Derbyshire, 33 m. n.w. of Derby. It lies 900 ft. above the sea, in a deep valley, surrounded by hills and moors, which have been tastefully planted; the only approach being by a narrow ravine, by which the Wye flows into the Derwent. The new part of the town is much under the level of the old. Five m. to the e. of B. is Chee Tor, a perpendicular limestone rock, rising to a height of between 300 and 400 ft. from the Wye. B. has, for 300 years, been famous for its calcareous springs, tepid ( $82^\circ F.$ ), and cold (discharging 120 gallons of water per minute), and its chalybeate springs. It is visited annually, from June to October, by 12,000 to 14,000 persons, the waters being taken for indigestion, gout, rheumatism, and nervous and cutaneous diseases. Nearly 5000 strangers can be accommodated at one time. There is an institution, called the Devonshire hospital, containing 100 beds, supported by subscription, where nearly 1000 patients are annually boarded and lodged free of charge. The baths and public walks are numerous. Much of the splendor of B. is due to the dukes of Devonshire, one of whom, in the last century, at the cost of £120,000, erected an immense three-storied pile of buildings of gritstone, called the Crescent, & curve of 200 ft., with wings of 58 feet. It includes several hotels, a library, assembly rooms, etc. Near B. is the Diamond hill, famous for its crystals; and Poole's hole, a stalactitic cavern 560 yards long. The Romans had baths here. Mary Queen of Scots resided for some time at B., when in the custody of the earl of Shrewsbury. B. is approached by railway both from n. and s.; and the baths, which were rebuilt some years ago, are considered among the finest in Europe. The town, which in 1891 had a population of 7424, is rapidly increasing. Several newspapers are published.

**BUXTON**, JEDEDIAH, 1705-72, an English prodigy of skill in numbers, b. in Elmton, Derbyshire. Though the son of a schoolmaster and grandson of a vicar, B.'s education was so neglected that he could not write, nor was he at an early period remarkable for knowledge of numbers. He never could tell how his singular power came, or how he used it; but it was observed that when "figuring" his attention was withdrawn from all external objects. He worked out every question by his own methods, without external aid, and without understanding the common rules of arithmetic. He would stride over a piece of land and tell the contents to almost exact measure. In this manner he measured the whole estate of Clinton, some thousands of acres, giving not only the acres but even the square inches. Then for his own amusement, he reduced the whole to square hair-breadths, on the base of 48 hairs to a lineal inch. His memory was such that he could stop in the midst of an abstruse calculation, and a week or even a month later resume it where he had left off. This mania for figures shut him out from all other knowledge, and on returning from church it did not appear that he had brought away a sentence that had been given out. His faculty was tested before the royal society, where he was presented with a gratuity. While in London he was taken to see Richard III., but his only enjoyment was in counting the number of words spoken by Garrick. He would easily count the steps of a company of dancers, but admitted that the sounds given out by a number of musical instruments perplexed him beyond measure.

**BUXTON**, Sir THOMAS FOWELL, a man of singular earnestness and force of character, belonging to the class termed "philanthropists," was b. in 1788 at Earl's Colne, Essex. The eldest son of a wealthy family, and early deprived of paternal guidance, his youth was distinguished chiefly by a strong development of animal energy, natural enough to a young Englishman whose full stature exceeded 6 ft. 4 inches. At the university of Dublin, his mind at length asserted its claims, and the new consciousness of needing to raise the family fortunes animated him to extraordinary efforts. His preparatory education had been almost thrown away, but at 21 he left the university its most distinguished graduate. In that year he married a sister of the celebrated Mrs. Fry, and entered business as a brewer, with an energy which in due time was crowned with splendid prosperity. His warm religious and moral impulses soon brought him prominently forward as an advocate of philanthropic interests. Prison discipline formed one of the earliest subjects of his efforts. In 1818, he entered parliament as member for Weymouth, which he continued to represent for about 20 years, taking a prominent part in

every debate on such questions as the amelioration of criminal law and of prison discipline, widow-burning and slave emancipation. The latter, in particular, engrossed a large share of his activity for many years, and no man on that side displayed more indomitable zeal and firmness in its advocacy. In 1837, he was rejected by his constituency, and refused ever after to stand for a borough. His philanthropic labors, however, terminated only with his life. In 1840, he received the well-merited distinction of a baronetcy. He died on 19th Feb., 1845. See *Memoirs of Sir T. Fowell B.* (1848).

**BUXTORF, JOHANN**, a celebrated orientalist, was b. 25th Dec., 1564, at Kamen, in Westphalia; studied at Marburg, Herborn, Basel, and Geneva. After traveling through Germany and Switzerland, he settled at Basel, where he became professor of Hebrew in 1591. He died of the plague, 18th Sept., 1629. In a knowledge of rabbinical literature, he surpassed all his contemporaries. The two works which prove his extensive acquaintance with this recondite branch of theological study, are his *Biblia Hebraica Rabbinica* (Basel, 1618-19), and his *Tiberias seu Commentarius Masorethicus* (Basel, 1620). The most useful of his grammatical works is the *Lexicon Hebraicum et Chaldaicum* (Basel, 1607).

**BUXTORF, JOHANN**, the son of the former, was b. at Basel, 18th Aug., 1599, and displayed at an early period a decided predilection for the same studies with his father. At five years of age—according to his rather credulous biographers—he could read German, Latin, and Hebrew. To perfect his knowledge of these tongues, he visited Holland, France, and Germany; and in 1630 was appointed to succeed his father in the chair of Hebrew at Basel, where he died 16th Aug., 1664. Besides his *Lexicon Chaldaicum et Syriacum* (Basel, 1622), and a work of Maimonides, entitled *Mora Nevochim* (Basel, 1629), which is an exposition of obscure passages of the Old Testament, he published from the MSS. of his father a *Lexicon Chaldaicum, Talmudicum, et Rabbinicum* (Basel, 1639), and *Concordantia Bibliorum Hebraicorum* (Basel, 1632).

**BUX'US.** See Box.

**BUYING OF PLEAS** by lawyers is prohibited by an old Scotch act passed in 1594. It is explained under the English term *champerty*, to which it is analogous.

**BUYUKDEREH**, or BÖYÜK-DERE, a beautiful suburb of Constantinople, from which it is a few miles distant, situated on the Bosphorus, in the midst of the most charming scenery. It forms the summer residence of many of the Christian ambassadors, some of whom have splendid mansions here.

**BUZZARD**, *Buteo*, a genus of *accipitres* (q.v.), or birds of prey, of the family *falconidae*, having a rather small and weak bill, which bends from the base, and is not notched, as in falcons. The legs are short and strong, the tarsi covered with scales or with feathers, the toes short, and the claws strong. Buzzards may be regarded as an inferior kind of eagles; they do not possess courage equal to that of eagles and falcons, nor equal strength of bill or claws. They are large birds; the common B. (*B. vulgaris*) measuring almost 4 ft. from tip to tip of its outstretched wings. It is a bird still pretty common in Britain, although much less so than it formerly was. It is subject to variations of plumage; the prevailing color is brown, with a considerable mixture of black on the upper parts, and of white or grayish-white on the under. It is sluggish and inactive, in comparison with many other birds of the same family; is usually slow in its flight, and often sits long on a tree, watching for prey, which, when it perceives, it glides silently into the air, and sweeping rapidly down, seizes it in its claws. This B. is plentiful in all the wooded parts of Europe; it is found also in the n. of Africa, and is known to exist in the western parts of Asia; but it is doubtful how far it extends over that continent, a distinct although very similar species occurring in the Himalaya mountains. The common B. is, however, a North American bird. Tame female buzzards have been known in several instances to exhibit so strong a propensity for incubation, and the rearing of young, at the proper season, that they have hatched hens' eggs and brought up the chickens, although if chickens not of their own hatching were brought within their reach, they devoured them. Meat given to the B. nurse was carefully divided among her nurslings, but they found out by their own instincts the use of grain and other vegetable food.—The rough-legged B. (*B. lagopus*) is very similar to the common B., but is at once distinguished by having the tarsi feathered to the toes, whilst in the common B. they are covered with scales. It is a rarer British bird, yet not of unfrequent occurrence; it is very widely diffused, being found in the old world from Lapland to the cape of Good Hope, and equally common in North America. It is most frequently to be seen in marshy districts, and often skimming over marshes, where it makes prey of frogs.—The red-tailed hawk of North America is a species of B. (*buteo borealis*). It is in very bad repute among American farmers and housewives for its frequent invasion of poultry-yards, from which it has acquired the name of *hen-hawk*.—Several other species of B. appear to be limited to particular parts of the world, as *buteo jackal*—so called from the resemblance of its voice to that of the jackal—to s. Africa, and *B. melanosternon* to Australia. The Australian species has the head, chest, and center of the belly deep black. The honey-buzzards (q.v.) belong to a different genus, although nearly allied to the true buzzards, as are also the harriers (q.v.), of which the most common British species, the marsh harrier, is sometimes called the *moor buzzard*.—Bald B. is the name of the osprey (q.v.). See **TURKEY BUZZARD**, under **VULTURE**.

**BUZZARD'S BAY**, on the s. coast of Massachusetts, about 80 m. long by 7 wide; sheltered from the ocean by the Elizabeth islands and Vineyard sound. In the bay are the harbors of New Bedford, Wareham, Sippican, Fairhaven, and Mattapoiset.

**BY-BIDDING**, at auctions where the bidder may be employed by the owner, and really bidding to enhance the price, not meaning to purchase. This form is unlawful; but bidding merely to prevent the sale of property below its actual value is not so considered.

**BYBLOS**, an ancient city of Phenicia, now called Jubell, situated at the base of the lower range of the Libanus, about half-way between Tripoli and Beyrout. B. was famous as the birthplace of Adonis, or Thammuz, in whose honor a splendid temple was erected, which attracted many worshipers. The name given to the town by the Jews was Gibleh, and its inhabitants the Giblites are noticed in the Scriptures as stone-squarers and caulkers of ships. A wall belonging, apparently, to the era of the crusades, surrounds the town, and the remains of a Roman theater are still visible.—B. was also the name of a town in the Egyptian delta, celebrated for its manufacture of papyrus from the byblus or papyrus plant.

**BY-LAWS** are the private regulations which are usually made by corporate bodies for the control and government of the corporation. They are binding, unless contrary to the laws of the land, or to the charter, or act of incorporation, or, as it has been decided in England, unless they are manifestly unreasonable. Blackstone tells us that the right of making by-laws was allowed by the law of the twelve tables at Rome; and Mr. Stephen, in his *Commentaries*, states that in the law of England such a right is so much of course, as regards every corporation, that if the charter by which certain persons are incorporated give to a select body, out of their whole number, a power to make by-laws as to certain specified matters, the body at large is nevertheless at liberty to make them with regard to all matters not specified. Every corporation, too, can of course alter or repeal the by-laws which itself has made. By the municipal corporation act, 5 and 6 Will. IV. c. 76, s. 90, borough councils have power to make by-laws for the government of the borough, and for the prevention and suppression of nuisances; such by-laws, however, not to be of force till the expiration of forty days after the same, or a copy shall have been sent to one of the secretaries of state, during which period her majesty, with the advice of her privy council, may either disallow the by-laws, or a part, or enlarge the time within which they shall not come into force. Railway companies are required to lay before the board of trade, certified copies of their by-laws and regulations.

**BYLES, MATHER, D.D.**; 1706–88; graduated at Harvard, and ordained minister of the Hollis street church, Boston, in 1733. In 1765, he was given the degree of doctor of divinity by the university of Aberdeen. He was a correspondent of Swift and Pope, and published a volume of his own poems. During the revolution he adhered to the English side, and for that reason his connection with his parish was dissolved. In 1777, he was denounced as an enemy to the country, imprisoned for a time, and condemned to exile, but the latter sentence was commuted to confinement in his own house, before which sentinels were placed. His reputation for quick and caustic wit has kept his memory alive.

**BYNG, GEORGE, Viscount TORRINGTON**, a British admiral, b. Jan. 27, 1663, eldest son of John Byng, esq., of Wrotham, Kent, entered the navy as a volunteer at the age of 15, and rapidly rose to the rank of lieutenant. In 1688, he recommended himself to the prince of Orange by his activity and zeal in attaching the officers of the fleet to the cause of the revolution, and was advanced to the rank of captain. In 1702, he took part in the capturing and burning of the Spanish fleet at Vigo, and in the following year was made Rear-admiral of the Red. The attack on Gibraltar was solely confided to his command and for his gallant conduct at the battle of Malaga he was knighted by queen Anne. In 1708, he became Admiral of the Blue, and commanded a squadron fitted out to oppose an intended invasion of Scotland from France, on the part of the pretender. He pursued the French fleet to the firth of Forth, took one ship, and forced the fleet back to Dunkirk, on which occasion he was presented with the freedom of the city of Edinburgh. On the breaking out of the rebellion of 1715, he was appointed to the command of a squadron in the Downs, and for important services against the French, was created a baronet. In 1718, he commanded the English fleet sent to Sicily for the protection of the neutrality of Italy, and gained a victory over the Spanish fleet off Messina. Soon after, he was appointed treasurer of the navy, and rear-admiral of Great Britain. In Jan., 1721, he was sworn one of the privy council, and in Sept. following, created baron Southhill and viscount Torrington. On the revival of the Order of the Bath, in 1725, he was installed one of the knights; and, on the accession of George II., was nominated first lord of the admiralty. He represented Plymouth in parliament from 1706 until 1721. Died Jan. 17, 1738.

**BYNG, JOHN**, a brave but ill-fated British admiral, fourth son of the preceding, b. in 1704, entered the navy early, served under his father, and, in 1727, became captain. In 1748, he had attained the rank of Admiral of the Red. In 1756, he was appointed to com-

mand a squadron of ten ships of the line in the Mediterranean, destined for the relief of Minorca, at that time blockaded by a French fleet under La Galissoniere. On the 20th May, B. made the signal to engage, which was obeyed by Rear-admiral West with such impetuosity that several of the enemy's ships were driven out of the line; but B. not advancing to his support, the French were allowed to escape, and Minorca was lost. The dissatisfaction in England, on the news arriving, was taken advantage of by the ministry to avert the public odium from their own inefficient measures. B. was tried by a court-martial, and condemned to death, for a breach of the 12th article of war, but recommended to mercy. Sacrificed to the general indignation, he was shot on board the *Monarch*, at Portsmouth, Mar. 14, 1757, meeting his fate with firmness and resignation. In the fleet, he was not popular, being a strict disciplinarian.

**BYNKERSHOEK**, CORNELIUS VAN, a Dutch juriconsult, was b. at Middelburg, in Zealand, 29th May, 1673. He studied at the university of Franeker, took the degree of doctor in 1694, and immediately after commenced to practice as an advocate of the Hague. In 1703, he was elected by the states-general a member of the supreme court, and, in the exercise of his functions, soon had occasion to observe how defective and vague was the common law of the country. In 1710, with a view to remedy this, he published the first part of his *Observationes Juris Romani*; in 1719, his *Opuscula Varii Argumenti*; and in 1724, he was elevated to the dignity of president of the supreme court. In 1733, appeared the rest of his *Observationes Juris Romani*. B. now began to devote himself earnestly to the study of Dutch and international law, acquiring, of the former in particular, a most extensive and solid knowledge. His great work on this subject is his *Questiones Juris Privati*, which he did not live to finish, and on the other, his *Questiones Juris Publici*. In addition to these, B. collected (from his notes) the decisions and proceedings of the supreme court in his time, under the title *Observationes Tumultuariae*, and besides (what is perhaps his most valuable work) made a digest under the title of *Corpus Juris Hollandici et Zelandici*, of all the laws of his own country, whether statutory, or existing in the decisions of courts, or in the practice of the bar, or in the customs of particular places. He died 16th April, 1743. A complete edition of his works was published by Prof. Vicat, of Geneva, in 1761.

**BYRAM RIVER**, a small stream, scarcely more than a brook, which is often mentioned as the furthest western boundary of New England, separating the towns of Greenwich, Conn., and Rye, N. Y. Recent surveys have straightened the boundary line, which, however, still begins at the mouth of the river and follows it a short distance. One mile above its entrance into Long Island sound, the stream widens, receives the tide, and is navigable for the smaller class of vessels to the village of Port Chester.

**BYRD, WILLIAM**, 1674-1744; b. Va., and educated in England, where he became a fellow of the royal society. Returning to America, he was receiver-general of revenue in Virginia, colonial agent, member of the council, and one of the commissioners to fix the North Carolina boundary. He laid out the cities of Richmond and Petersburg in 1733 on his own land. He bought in England the *Records of the Virginia Company* (1610-24).

**BYRGIUS**, JUSTUS, or, more properly, JOBST BÜRGER, the inventor of various astronomical instruments, was b. 28th Feb., 1552, at Lichtensteig, in the canton of St. Gall, Switzerland. In 1579, he went into the service of the learned landgraf of Hesse, Wilhelm IV. His first work was a celestial globe, the surface of which was plated with silver, and in which the stars were placed according to his own observations. The landgraf sent it to the emperor Rudolf II., who thought it so beautiful that, in 1604, he appointed B. his own mechanician. B. subsequently went to Austria, but returned to Cassel in 1622, where he died in 1633. Many of his reputed discoveries and inventions are questioned, such as those of logarithms and the proportional compasses; but he seems to have hit upon something like both, while it is certain that he was the inventor of a method of resolving spherical triangles.

**BYRLAW**, Birlaw, or Burlaw, the name given to a sort of popular jurisprudence formerly in use in Scotland, in villages and among husbandmen. Sir John Skene, writing in 1597, when the system was in full force, defines B. as "*leges rusticorum, de re rustica lata*—laws made by husbandmen, concerning neighborhood to be kept among themselves."—*Reg. Majest.* lib. iv. c. 89; *De Verb. Signif.* voce Byrlaw. As the B. was enacted by the common consent of the villagers or neighbors, so it was administered by judges chosen by them from their own ranks. These judges were commonly called "byrlaw men," a name which is still applied in some parts of Scotland to an arbiter, oddsman, or umpire. The courts which they held were called "byrlaw courts," and took cognizance of disputes between neighbor and neighbor. B. is supposed to be derived from *boor*, or *bower*, a countryman.

**BYRON, JOHN**, 1692-1763; an English poet and miscellaneous writer. *Colin and Phoebe*, his first poetical essay, appeared in the *Spectator*. He was made a member of the royal society; invented and taught a system of short-hand writing; was a person of lively wit, and had a taste for the mystical theology of Böhme.

**BYRON, ANNE ISABELLA MILBANKE**, 1792-1860; only child of sir Ralph Milbanke, and wife of lord Byron. She married lord Byron Jan. 2, 1815, and separated from him in Feb. of the next year. On the death of lord (properly baron) Scarsdale, she became

baroness of Wentworth, and for several years before her death employed her large income in works of charity. One child was borne by her to Byron, "Ada, sole daughter of my house and heart," who married William, lord King, afterwards earl of Lovelace. See Harriet Beecher Stowe's *Lady Byron Vindicated* (1809).

**BYRON, GEORGE GORDON**, Lord, a great English poet, was b. in Holles street, London, on the 22d of Jan., 1788. He was the only son of capt. John Byron, of the guards, and Catherine Gordon of Gight, an heiress in Aberdeenshire. Capt. Byron and his wife did not live happily. Domestic peace perished in the conflict of their ungovernable tempers. The husband's habits were profligate in the highest degree, and the wife's fortune was soon squandered in the debauch and at the gambling-table. Separated from her husband, the lady retired to the city of Aberdeen with her little lame boy, whom she passionately loved, her sole income at this time being about £180 per annum. In his 11th year, B. succeeded his grand-uncle, William lord Byron; and mother and son immediately left the north for Newstead abbey, the ancient seat of the family, situated a few miles distant from Nottingham, in the romantic district which Sherwood forest shadowed, and which was once familiar with the bugle of Robin Hood. On succeeding to the title, B. was placed in a private school at Dulwich, and thereafter sent to Harrow. The most remarkable thing about B.'s early years was his extraordinary attachments. Like almost every member of the poetic tribe, he "had a passion for the name of Mary." In his 8th year, in Aberdeenshire, he fell in love with Mary Duff. Margaret Parker, a cousin of his own, and who died early, was his next idol. His strongest passion was, however, for Mary Chaworth. This lady he first met when on a visit to Newstead in 1803, at which date he was in his 15th year. Miss Chaworth's father had been killed in a duel by lord Byron, the grand-uncle of the poet, and marriage would have healed the family feud, and would have joined rich estates. But it was not to be. Miss Chaworth was B.'s senior by two years, and evidently felt little flattered by the worship of the lame Harrow boy. Next year came the parting interview described in *The Dream*, with which every Englishman is familiar now as with a personal experience. In 1805, B. removed to Trinity college, Cambridge; and two years thereafter, his first volume of verse, entitled *Hours of Idleness*, was printed at Newark. The poems therein contained were not absolutely without merit, but they might have been written by any well-educated lad who, in addition to ordinary ability, possessed the slightest touch of poetic sensibility. The volume was fiercely assailed by lord (then Mr.) Brougham in the *Edinburgh Review*, and his sarcasms stung B. into a poet. The satire, *English Bards and Scotch Reviewers*, was written in reply to the article in the *Edinburgh*, and the town was taken by a play of wit and a mastery of versification unequalled since the days of Pope. In the babble of praise that immediately arose, B. withdrew from England, visited the shores of the Mediterranean, and sojourned in Turkey and Greece. On his return in 1812, he published the first two cantos of *Childe Harold*, with immense success, and was at once enrolled among the great poets of his country. During the next two years, he produced *The Giaour*; *The Bride of Abydos*; *The Corsair*; and *Lara*. While these brilliant pieces were flowing from his pen, he was indulging in all the revelries and excesses of the metropolis. What was noblest in the man revolted at this mode of life, and, in an effort to escape from it, he married Miss Milbanke, daughter of sir Ralph Milbanke, a baronet in the co. of Durham. This union proved singularly infelicitous. It lasted only a year, and during that brief period, money embarrassments, recriminations, and all the miseries incident to an ill-assorted marriage, were of frequent occurrence. After the birth of her child Ada, lady Byron retired to her father's house, and refused to return. This event, from the celebrity of one of the parties, caused considerable excitement in the fashionable world. B. became the subject of all uncharitable tongues. The most popular poet, he was for a space the most unpopular individual in the country. In one of his letters, written from Italy some years later, referring to the slanders current at the time, he thus expresses himself: "I was accused of every monstrous vice by public rumor and private rancor. My name, which had been a knightly or a noble one since my fathers helped to conquer the kingdom for William the Norman, was tainted. I felt that if what was whispered, and muttered, and murmured was true, I was unfit for England; if false, England was unfit for me. I withdrew." The separation from his wife, and the departure from England, mark a stage in B.'s genius. A new element of power had entered into his verse; the reader feels it quite distinctly in the burst of exultation that opens the third canto of the *Childe*.

Misery and indignation stimulated him to remarkable activity. Six months' stay at Geneva produced the third canto of *Childe Harold* and *The Prisoner of Chillon*. *Manfred* and *The Lament of Tasso* were written in 1817. The next year, he was at Venice, and finished *Childe Harold* there; and, in the gay and witty *Beppo*, made an experiment in the new field which he was afterwards to work so successfully. During the next three years, he produced the first five cantos of *Don Juan*, and a number of dramas of various merit, *Cain* and *Werner* being opposite poles. In 1822, he removed to Pisa, and worked there at *Don Juan*, which poem, with the exception of *The Vision of Judgment*, occupied his pen almost up to the close of his life. Morally, his Italian life was unsatisfactory, and his genius was tainted by his indulgences. At the close of his career, he was visited

by a new inspiration; the sun, so long obscured, shone out gloriously at its setting. In the summer of 1823, he sailed for Greece, to aid the struggle for independence with his influence and money. He arrived at Missolonghi on the 4th of Jan., 1824. There he found nothing but confusion and contending chiefs; but in three months, he succeeded in evoking some kind of order from the turbulent patriotic chaos. His health, however, began to fail. On the 9th of April, he was overtaken by a shower while on horseback, and fever and rheumatism followed. Medical aid was procured, and copious bleeding recommended; but this, B., with characteristic willfulness, opposed. Before death, he sank into a state of lethargy, and those who were near heard him murmuring about his wife, his sister, and his child. After twenty-four hours' insensibility, he expired on the evening of the 19th April, 1824. His body was conveyed to England; and, denied a resting-place in Westminster abbey, it rests in the family vault in the village church of Hucknall, near Newstead.

Lord B. is a remarkable instance of the fluctuations of literary fashion. Elevated to the highest pinnacle of fame in the heyday of his early popularity, he was unduly depressed after his death, when the false romance which he threw around himself and his writings began to wear away; and it is only during the last twenty or thirty years that the proper place has been found for him in the public estimation. He is high, but not the highest. The resources of his intellect were amazing. He gained his first reputation as a depicter of the gloomy and stormful passions. After he wrote *Beppo*, he was surprised to find that he was a humorist; when he reached Greece, he discovered an ability for military organization. When all the school-girls of England fancied their handsome idol with a scowling brow and a curled lip, he was laughing in Italy, and declaring himself to be the most unromantic being in the world. And he was right. Take away all his oriental wrappings, and you discover an honest Englishman, who, above all things, hates cant and humbug. In *Don Juan* and his *Letters* there is a wonderful fund of wit, sarcasm, humor, and knowledge of man. Few men had a clearer eye for fact and reality. His eloquence, pathos, and despair; his *Manfreds* and *Childe Harolds*, were only phases of his mind. Toward the close of his life, he was working toward his real strength, and that lay in wit and the direct representation of human life. If his years had been extended, he would in all likelihood have deserted poetry for prose, gaudy colored fiction for sober fact; and the assertion may be hazarded, that the English novel would have boasted of another and a greater Fielding. The *Life* by Moore (1880) is still the standard. See also the account of his life and work by Prof. Nichol in the "English Men of Letters" series; *Lord Byron jugé par les témoins de sa vie* by the Countess de Guiccioli (1868); *Lady Byron Vindicated*, by Harriet Beecher Stowe (1869), and *The Works of Lord Byron*, edited by W. E. Henley (1897).

**BYRON, HENRY JAMES**, b. Manchester, England; 1834-84; author of many dramatic works, chiefly in burlesque, that have won popular favor. Among them are *Fra Diavolo*; *Maid and Maggie*; *Babes in the Wood*; and travesties of many of the more popular operas. Of comedies he was author of *War to the Knife*; *A Hundred Thousand Pounds*; *Not Such a Fool as he Looks* (in which he played the hero); *An American Lady*; *Old Sailors*; and *Our Boys*, the last comedy achieving an almost unexampled success.

**BYRON, Hon. JOHN**, 1723-86; an English admiral and circumnavigator. He was the grandfather of Byron the poet. While young, he accompanied Anson around the world, and in later years experienced so much hard service that he was nicknamed by sailors "Foul-weather Jack." In 1769, he was a governor of Newfoundland, and in 1776 became vice-admiral. In 1778, he was sent with a fleet to watch the movements of Count d'Estaing, who had gone to the assistance of the American colonies then in revolution; and in July of the next year, fought the count off Grenada, but the action was of little importance.

**BYRON BAY** lies on the n.e. coast of Labrador in North America, its lat. and long. being respectively 54° 40' n., and 57° 30' w.

**BYRON ISLAND** is situated in the Mulgrave archipelago of the Pacific ocean, its lat. and long. being respectively 1° 18' s., and 177° 20' east.

**BYSSUS**, a name given from ancient Greek and Roman times to the bundle of silky filaments by which many lamellibranchiate mollusks—bivalve shells—attach themselves to rocks or other fixed substances. The B. springs from a cavity at the base of the solitary foot of the mollusk, and its filaments, which are capable of being reproduced if destroyed, are secreted by a glandular tissue which occupies a furrow running nearly to the extremity of the foot. They are united together at the base in a common mass, and are often considerably divergent. They are guided to their place by the foot, and expand into a sort of disk at the point of attachment, so as to have a firm hold. A few common mussels in an aquarium readily afford an opportunity of observing the B., particularly when the filaments are attached to the glass sides of the vessel.

**BYSSUS** (Gr., a fine flaxen or silky substance), a genus established by Linnæus to include some of the lowest and most obscure forms of vegetation, and defined as having a substance like fine down or velvet, simple or feathered. Botanists sometimes ranked it among *algæ*, sometimes among *fungi*; it has been made the type of a group *bysseæ*, and placed among lichens. Some have regarded this group as entitled to the rank of

a distinct order, "comprehending the filamentous fungi found in cellars, and similar plants," but others reject the genus as altogether spurious. Some of the species once included in it have now been satisfactorily shown to be lichens, others to be *conferaceae*, whilst many appear to be really not distinct vegetable forms, but cryptogamic plants prevented by unfavorable circumstances from proper development. The green incrustations formerly regarded as species of *B.*, have been found to be the primary germination of mosses, often species of *polytrichum* and *tortula*. It cannot be said, however, that the nature of all the vegetable forms which have been referred to the genus *B.*, has yet been satisfactorily ascertained. Some of them are very phosphorescent, and are generally found where some higher form of vegetation is undergoing decay.

**BYSTRÖM**, JOH. NIKOLAUS, a celebrated sculptor, was b. 18th Dec., 1788, at Philippstadt, in the province of Wermeland, Sweden, and educated under Sergell of Stockholm. In 1809, he obtained the highest prize in the Swedish academy of arts, and in the following year went to Rome, where he executed his first independent work, a "Drunken Bacchante," and sent it home. It was received with great approbation, and *B.* had to repeat it thrice. In 1815, he returned to Stockholm, and surprised the newly elected crown-prince by exhibiting a colossal statue of himself, which he had finished all but the head in Rome, and had found means to complete quietly in Stockholm. The crown-prince was highly gratified, and commissioned *B.* to execute colossal statues of Charles X., XI., and XII. After 1838, he resided in Stockholm; but returned to Rome in 1844, and died there Mar. 18, 1848. His chief works are: "A Nymph going into the Bath," a "Reclining Juno suckling the Young Hercules," "Hygieia," a "Pandora combing her Hair," "A Dancing-girl," a statue of Linnæus, and colossal statues of Charles XIII., Gustavus Adolphus, and Charles XIV. *B.* excels in the delineation of females and children, but his male figures want strength of character; his conceptions are always true to nature, his grouping skillful and pleasant, and his execution is clear and distinct.

**BY-TERMS**, in the vocabulary of Oxford university, are the Lent, or Hilary, Easter, and Trinity terms, which, in distinction from the first or Michaelmas term (Oct. 10-Dec. 17), are for various reasons less advantageous for joining the university.

**BYTTNERIACEÆ**, a natural order of exogenous plants, sometimes united with the order *sterculiaceæ* (q.v.), and also closely allied to *malaçææ* (q.v.), from which it differs, especially in the stamens not being columnar—although more or less united, generally into a cup or tube—also in the anthers being turned inwards, and 2-celled. The species of this order are trees, shrubs, or half-shrubby plants, abounding chiefly in tropical climates, although some are natives of the temperate zones. About 400 have been described. The flowers of many are beautiful. The most important product of the order is COCOA (q.v.). The fruit of *guazuma ulmifolia*, a native of Brazil, is eaten, being filled with a sweet and pleasant mucilage. The young bark of this tree yields, when macerated, a copious mucilage, and is therefore used in Martinique for clarifying sugar, as is that of *kydia calycina* in the northern provinces of India. *Guazuma ulmifolia* was introduced into India, and at one time largely cultivated in the Madras presidency, under the name of bastard cedar, that its foliage and young shoots might be employed as fodder for cattle. Its straight, luxuriant young branches yield a strong fiber. The bark of other species of this order also affords a tough fiber, which is employed for making cordage, particularly that of *microlæna* (or *schillera*) *spectabilis* in the regions on the southern base of the Himalaya, *abroma augustum* in various parts of India, *dombeja spectabilis* in Madagascar, and *D. umbellata* in the isle of Bourbon.

**BY-TOWN**, a t. of Upper Canada, on the Ottawa, which took its name from Col. By of the royal engineers. It is now *Ottawa* (q.v.), the capital of the dominion of Canada.

**BYZANT**. See BESANTS.

**BYZANTINE ART**. From the time of Constantine the Great, the emperors of the east arrogated to their imperial city the pre-eminence which, for so long a period, ancient Rome had actually possessed; and, as a necessary consequence of this assumption, Constantinople, or Byzantium, as it still continued sometimes to be called, became the rival of the mother-city in the richness and variety of its artistic monuments. In Rome, and, indeed, in the whole of western Europe, the first effect produced by the influx of the mighty stream of barbarian life, and the consequent dissolution of existing society, was the almost total suppression of artistic effort. It was then that the artists of the west, willing and eager to avail themselves of the invitation held out to them, poured into Constantinople, carrying with them what yet remained of the artistic life of the ancient world. Byzantium was the hearth on which, during the dark period of the middle ages, those feeble sparks of ancient art were kept alive, which served to kindle the new and independent artistic life of the modern world. Not only were the painters and sculptors of Italy indebted to the art of Byzantium for the tradition of that ideal mode of conception to which the term classical is peculiarly applied, but artists in every department derived thence the elements of that technical knowledge without which the embodiment of such conceptions is impossible. This practical acquaintance with the technical rudiments of their respective arts, which could scarcely have been derived from a mere examination of ancient works, was communicated to the fathers of Italian

art by living Byzantines, some of them probably the descendants of those whom barbarian conquests had driven into the east, and whom the conquests of a still more barbarous race now restored to western Europe. It is impossible to doubt that modern art was largely indebted to this circumstance for the marvelous stride which it took immediately after the taking of Constantinople by the Turks. But though its chief value may consist in its having thus transmitted to us the succession of antiquity, B. A. was by no means devoid of original and individual character; and it is only in so far as it possesses this, and not when regarded as a mere conservation of antique types and processes, that it takes rank as a school of art. The characteristic element in B. A. may be described as the earliest artistic recognition and representation to the senses of what was new and peculiar in Christian as opposed to heathen life. To the fullest extent to which it could claim a separate and individual existence, B. A. was Christian art; and consequently in Germany, where the subject has received more attention than in this country, the two terms are frequently used as synonymous. The appearance of B. A., in this its only peculiar sense, dates from the age of Justinian, i.e., from the earlier half of the 6th c., and its productive period may be said to terminate with the conquest of the eastern empire by the crusaders in 1204. But though its declension dates from this event, B. A. continued to exist in considerable vigor down to the final destruction of the empire of the east, in 1453; and even now may be seen as the inseparable handmaid of the Greek church, both in Europe and in Asia. It is in this point of view, and more particularly as forming the basis of artistic life in Russia, that B. A. possesses its chief living interest in our day. What Rome was to the western, Byzantium was to the eastern European; and the relation of the latter to his mother-city, if it commenced at a somewhat later date, continued during the whole period of the middle ages.

Though the inhabitants of eastern Europe thus derived their traditions of antiquity from a meaner source than the Romanic nations, they received them more unbroken; and, from first to last, were subjected to their influences during a much longer period. To them the living voice and hand continued to communicate what for nearly a thousand years Italians, Spaniards, and Franks had had to seek in the dead image and letter alone; and if anything still remains unrecorded of ancient thought, it doubtless dwells on Greek, and not on Roman or German tongues. Indolent, luxurious, and dissolute as their ancestors had been in classical times, the citizens of Constantinople were distinguished by an intellectual character, which, unfruitful and enfeebled though it was, was systematic, subtle, mystical, and pedantic. They were eminently an instructed people; but, like individuals whose glory is in the past, they were more conservative than original; and, however justly we may despise the chaff which they engendered, it is impossible to overestimate the value of the corns of gold which clung to their memories.

**BYZANTINE ARCHITECTURE.** The typical form of B. A., at least as applied to ecclesiastical purposes, was fixed by the church of St. Sophia, which still exists as the great mosque of Constantinople. It was built, or rather rebuilt, by the orders of Justinian, the architects being Anthemius of Tralles, and Isidorus, the elder, of Miletus, and completed 537 A.D. Though the largest and most magnificent, the church of St. Sophia was but one of 25 churches which were erected in the capital, and of a vastly greater number of ecclesiastical structures with which the provinces were adorned by the pious emperor. The style thus introduced largely influenced the architecture even of western Europe; and in St. Mark's at Venice, the churches at Ravenna and elsewhere on the Adriatic, and even in the cathedral of Aix-la-Chapelle, we have examples of churches almost purely Byzantine. The fundamental principle in the construction of Byzantine churches was an endlessly varied application of the Roman arch, whilst its exhibition in the form of the cupola was their most characteristic feature. In the St. Sophia, as was generally the case, the cupola covered the principal central portion of the church, and was supported by strong and lofty pillars, bound together by bold arches. To this central space were usually joined others of smaller size, which were covered by half-cupolas or arches of more ordinary construction. Though frequently in the form of a Greek cross, with the great cupola rising in the center, and smaller or semi-cupolas surmounting the four arms, neither this nor any other plan was consistently adhered to in Byzantine churches. The windows were always semicircular, similar to those in the Romanic churches of Germany, and in our own Saxon or early Norman churches; but the doors were frequently square-headed, after the classical model. Many of the details, such as the square capitals tapering downwards, and the bold projecting moldings ornamented with foliage, seem to have owed their origin entirely to the ingenuity of Byzantine architects. The earlier Byzantine churches were profusely ornamented with mosaics, which, after the admixture of the Gothic element, and the adoption of the pointed arch, gave place to fresco-paintings. The constant use of the apse (q.v.) is, after the cupola, perhaps their most marked feature. The following division into periods, though, like most divisions of the kind, somewhat arbitrary, has the authority of M. Couchaud, an eminent French architect, in its favor, and is, apparently, adopted by Parker: 1. From the time of Constantine to the middle of the 6th c.; 2. From the beginning of Justinian's reign down to the 11th c., which comprises the greater part of the existing buildings of the pure Byzantine type; 3. From the 11th c. to the conquest of Greece by the Turks,



when the influence of the Venetian conquests is apparent in the intermixture of Italian and Gothic details and characteristics. See ARCHITECTURE.

**BYZANTINE SCULPTURE.** When contrasted with the ignoble, tasteless, and meaningless productions of the later plastic art of Rome, that of Constantinople claims both admiration and respect. The figures are not deficient in dignity either in form or in attitude, and a deeply Christian spirit is traceable both in their general conception, and in their rich and significant symbolical accompaniments. In sculpture, as in architecture, the peculiar Byzantine type first exhibits itself towards the beginning of the 6th century. Alongside of unmistakable reminiscences of the antique, it exhibits characteristics which are as unquestionably oriental. The figures are positively laden, not with drapery alone, but with costume, which obscures the nobler and freer lines in which the ancients delighted. The execution is careful, even painful. All this becomes more and more the case as we advance in the order of time, the earliest Christian works, and those immediately suggested by the antique, exhibiting such faults only to a limited extent. Down to the 12th c., the defects which we have described were the worst which could be laid to the charge of B. sculpture, and it is scarcely earlier than the 13th c. that it assumes that mummy-like aspect by which it is too generally known. The art of carving in ivory was practiced with great success at Constantinople, and in the examples of it which remain, the gradual decline—the *benumbing process*, as it has been aptly called—may be traced with great distinctness. Of this species of work, in its earlier and better time, a fine specimen in alto-relievo of the “forty saints” may be seen in the museum at Berlin. The decorations of the churches, and of the sacred vessels used in the service of the altar, formed no insignificant objects of art in the better Byzantine period. Cups, plates, lamps, candlesticks, crosses, and the like, were either of gold or silver, and frequently adorned with jewels; whilst the altar itself, the chancel, and sometimes the whole interior of the church, were covered with precious metals, the panels being adorned with mosaics or frescos.

**BYZANTINE PAINTING.** The same characteristics which we have ascribed to the sculpture belonged to the pictorial efforts of the artists of Byzantium, and of the neighboring countries who were mostly their imitators. The execution was careful and anxious rather than skillful, and such skill as still remained was exhibited in the mechanical perfection with which the gilding of the backgrounds and other details were managed. Of B. pictures, the best existing specimens are to be found in Italy, and belong especially to the school of Sienna. The picture of the Virgin in the church of St. Domenico at Sienna by Guido, bearing date 1231, deserves special mention. Much labor was expended on the illumination of MSS. of the Scriptures, and of these many beautiful examples, as fresh as when they were painted, may be seen in most of the larger public libraries of Europe. The chief interest attaching to B. painting consists in the parental relation in which it stood to the art of Italy. Cimabue may be regarded as its immediate heir; and in the works of Giotto, Leonardo da Vinci, Pietro Perugino, and even of Raphael in his earlier time, the traces of the inheritance are quite unmistakable. See PAINTING.

**BYZANTINE EMPIRE**, also styled the **EAST ROMAN**, **EASTERN**, or **GREEK EMPIRE**, was founded in 395 A.D., when Theodosius the great, at his death, divided the Roman empire between his two sons, Arcadius and Honorius. The former, a weak and luxurious character, was made emperor of the eastern division, formerly included under the prefectures of the east and of Illyricum—namely, Syria, Asia Minor, and Pontus, stretching along the shores of the Black sea in Asia; Egypt in Africa; and Thrace, Moesia (now Bulgaria), Macedonia, Greece, and Crete in Europe. Arcadius left the government of the empire in the hands of his minister, Rufinus, from whom it passed to the eunuch Eutropius, and afterwards to Gainas, the murderer of Rufinus. Gainas fell by his ambition in 401, and the shameless and avaricious empress Eudoxia ruled until the time of her death, 404. See **ARCADIUS**. After Theodosius II., a minor, under the guidance of the prefect Prætorio Anthemius, had held the reins during six years, he resigned the government in favor of his sister Pulcheria (Augusta), who ruled powerfully while her brother was kept apart from all state affairs. Western Illyria (comprehending Pannonia, Dalmatia, and Noricum) was ceded to the Eastern empire by the Roman emperor, Valentinian III.; and after several victories achieved by the Byzantine general, Ardaburius; over the Persians, a part of Armenia was also annexed. But, nevertheless, Thrace and Macedonia could only be secured from the destructive conquests of Attila by the payment of tribute. After the death of Theodosius II., Pulcheria married the senator Marcianus (450–57), whose firmness repelled the invasions of Attila. Marcianus was followed by Leo I., surnamed Macella (the butcher), a Thracian of low birth, but elevated to the throne by the commander-in-chief, Aspar, who, being himself an Arian, would not venture to encounter the perils that sovereignty might have entailed on one of his religious views. Leo II., grandson of the former, succeeded, but died after a few months, in consequence of which the crown came into the possession of his father, Zeno (474–91), who was banished by Basiliscus (475), but who re-ascended the throne in 477. Though a weak and unpopular ruler, he contrived to retain his power in spite of several serious revolts. The internal distraction of the empire, to which, as at other times, religious strifes added considerably, increased greatly during the reign of Zeno,

and the invasions of the Goths were prevented only by gifts and stratagems. Ariadne, widow, of Zeno by her second marriage raised the courtier Silentiarius to the throne under the title Anastasius I. (491-518). By the help of the Goths, this monarch overthrew, after a six years' contest, the robber tribes at Mt. Taurus. A new enemy, however, now appeared on the Danube in the Bulgarians, against whose desolating raids Anastasius built the long wall, to protect the peninsula on which Constantinople lies. The war with the Persians also broke out anew during his reign; and religious tumults often purpled the streets of Constantinople itself. After his death, the army raised Justinus I. to the throne. He maintained his position mainly through the favor of the clergy, whom he had conciliated by his severe persecution of heretics.

His nephew, Justinian (q.v.), succeeded (527-65), and became celebrated by his code of laws, and by the victories of his great generals, Belisarius (q.v.) and Narses (q.v.). But the rapid decline of the empire after his death showed that he had not been able to give it any internal consolidation or vitality. It was during the reign of Justinian that those pestilent contests of the blues and whites against the greens and reds (political factions so named from the colors respectively worn) first attained any consequence; and though the first disturbance was terribly chastised by Belisarius in 532, they continued to distract the capital periodically down to the 7th century. Justin II. (565-78), a weak man, governed by his wife, Sophia, yielded a part of Italy to the Longobards, was unsuccessful against the Persians, allowed the Avari to plunder the Danubian provinces, and ultimately became insane through vexation and anxiety. Tiberius, the capt. of the guard, was then made regent, and after the death of Justin II., received the imperial dignity. He ruled with mildness and prudence (578-82), purchased a peace with the Avari, concluded the war with Persia, and left as his successor the commander-in-chief, Maurice, who reigned from 582 to 602. Having replaced on the throne the Persian king, Kosroes II., who had been banished by his subjects, he thus secured the peace of his eastern frontiers; but, on the other hand, the war against the Avari did not prosper. His niggardly treatment of the army caused a military insurrection, in which he was slain along with his son; and Phocas, one of his generals, was elevated to the throne. Phocas proved a bad ruler. Through his monstrous vices, tyranny, and incapacity for government, the empire lapsed into still deeper anarchy. Suddenly, however, a deliverer appeared in the person of Heraclius (q.v.), son of the exarch or governor-general of Africa, who headed a conspiracy, marched to Constantinople, overthrew the tyrant, and ascended the throne, 610. But great as was the genius of Heraclius, he had to submit to twelve years of defeat before he could organize and discipline a victorious army. In 622, he opened those magnificent campaigns in which the power of Persia was crushed, and which, in the opinion of Gibbon, were equal to those of Scipio or Hannibal. He lived, however, to see more formidable foes in the Arabs, who, inspired by fanatic zeal, and led by the caliph Omar, captured, during 635-41, the countries on the Euphrates, with Syria, Judea, and Egypt. The power of the Greeks, which was demanded to resist the Arabian invasions, was miserably divided and weakened by their unending religious quarrels, especially the controversy of the Orthodox against the Monothelites (q.v.). The empire was breaking asunder, and Heraclius, now worn out with the fatigues of war, had abandoned his enfeebled senses to pleasure, and his enfeebled intellect to theological discussions. He died in 641. Constantine III., who succeeded his father, Heraclius, also died soon after, and was followed by Heraclionas, who lost the crown, and was mutilated in an insurrection. The next ruler was Constans, the son of Constantine III., who ruled from 642 to 668, made himself odious by cruelty, and perished in an insurrection. His son, Constantine IV., Pogonatus (668-86), enforced a treaty of peace on the invading Arabs (675) by his successful use of the Greek fire, in warfare. On the other side, he was compelled to pay tribute in 680 to the Bulgarians, who had established themselves in ancient Mœsia. Justinian II. (685-711), son and successor of Pogonatus, was victorious in war against the Monothelite Maronites; but was defeated by the Bulgarians (688), and by the Arabs (692). His cruelty caused an insurrection, at the head of which was Leontius, who, in 695, deposed him, cut off his nose (hence his surname *Rhinotmetus*), and banished him to the Tauric Chersonese; in 705, he was restored to the throne, but adversity had taught him no wisdom. A part of his subjects revolted, and the king, abandoned by his army and by the Bulgarians, was assassinated in 711. With him the dynasty of Heraclius expired.

Philippicus Bardanes (the leader of the last insurrection against Justinian II.) was next raised to the throne (711); but having made himself odious by favoring the metaphysical tenets of the Monothelites, he was deposed, and brutally deprived of eye-sight (713). His successor, Anastasius II., prudently screened himself from a mutinous army by retreating into a monastery (716), and left the crown to Theodosius III., who abdicated in 717 when Leo, the Isaurian, and gen. of the army of the east, did not recognize him, and marched with hostile intent to Constantinople. Leo (q.v.) himself ascended the throne in 717, and drove back the Arabs from Constantinople, but unhappily gave occasion, in 726, for that contest concerning the worship of images, which rent the empire for more than a century. In 726, the exarchate of Ravenna was lost, and the eastern provinces became the prey of the Arabs, over whom, however, he won a great victory in Phrygia. He died in 741. Constantine V. (741-775), son of Leo III., on account of his zeal as an iconoclast, was hated by the monks, who gave him the surname "Cop-

ronymos," because (according to their malicious and uncleanly statement) he had polluted the font at his baptism. He was a brave ruler, recovered from the Arabs parts of Syria and Armenia, and ultimately defeated the Bulgarians, against whom he had long been unsuccessful. His son, Leo IV. (775-780), was a mild ruler; but by the ability of his generals, he made the boundaries of the empire secure against the Arabs. After him, Constantine VI. ascended the throne under the guardianship of his ambitious mother, Irene (q.v.), who raised a powerful party in favor of image-worship. Constantine having made an attempt to liberate himself from the influence of his mother and her paramour, Stauratius, Irene barbarously caused her own son to be blinded (797). He died soon after this atrocity; and Irene, who had boldly conceived the design of marrying the emperor Charlemagne, and thus uniting the e. and w. of Europe in one vast realm, excited the opposition which, in 802, placed her treasurer, Nicephorus, on the throne. Irene was banished to Lesbos, where she died in 808. Nicephorus, who fell in battle against the Bulgarians (811), was succeeded by his son, Stauratius, who soon yielded the throne to his brother-in-law, Michael I., from whom it was taken by the Armenian gen., Leo V., a powerful ruler, who conquered the Bulgarians, but fell (820) in a conspiracy excited by his zeal against image-worship. Michael II., the stammerer, was raised from a dungeon to the throne, and ruled until 829. In his reign, Crete and Sicily passed into the hands of the Arabs. Under the rule of his son, Theophilus, who is praised by the Byzantine historians for his love of justice (829-842), the gen., Manuel, gained some indecisive victories over the Arabs. Theodora, widow of Theophilus, and guardian of Michael III. (842-867), brought the controversy about images to a close at the council of Nicaea (842), when the worship of these was fully sanctioned and re-introduced. During this reign the government busied itself in the persecution of the Paulicians (q.v.), while the Arabs devastated the Asiatic provinces. Theodora, having been banished to a convent by her son, the government was for some time held by Bardas, uncle of Michael III., and after his assassination, by Basilus I., the Macedonian, who caused Michael to be put to death, and afterwards ruled ably from 867 to 886. But though on the whole successful against the Arabs, the latter contrived to make themselves masters of Syracuse. His dynasty (the Macedonian) maintained itself on the Byzantine throne, with some few interruptions, until 1056. The reign of his son, Leo VI., the philosopher, (886-912), was not prosperous. The inroads of the Bulgarians and of the Arabs, who, in 904, plundered Thessalonica, continued to increase during the government of his son, Constantine VII., Porphyrogenitus, who ruled mildly but feebly (912-959). Under his son, the dissolute Romanus II. (959-963), Crete was retaken from the Arabs by the vigor of his gen., Nicephorus Phocas, who, on the death of the emperor, married his widow, Theophania. She, however, caused him to be murdered in 969, as she wished to marry John Tzimiskes, who ruled till 976, and, like his predecessor, was victorious against the Arabs and Bulgarians, as also the Russians, who about this time began to emerge from obscurity as an enemy of the Byzantine power. His successor, Basilus II. (976-1025), the son of Romanus, conquered the Bulgarian kingdom, and attached it as a province to the empire, which it remained till 1186, when it again became independent. His brother, Constantine VIII. (1025-28), did not resemble him. Romanus III. next ascended the throne, but was assassinated by his wife, Zoe, a profligate but crafty princess, who raised successively to the imperial dignity Michael IV. (1034), Michael V. (1041), and Constantine IX. (1042). Meanwhile, Russians and Arabs devastated the realm. In Asia, the Seljuk Turks proved dangerous enemies; while in lower Italy, the Normans narrowed the Byzantine power to the possession of Otranto. After Constantine's death in 1054, Theodora, sister of Zoe, was elected empress; and on her death in 1056, Michael VI., who was deposed by Isaac I., Comnenus.

With Isaac I., Comnenus, who came to the throne in 1057, the dynasty of the Comnenian emperors began. He retired to a monastery (1059), and was succeeded by Constantine X., whose widow, Eudocia, married Romanus IV., and raised him to the throne. Romanus was deposed in 1071 by Michael VII. (son of Constantine X.), who, in his turn, was dethroned by Nicephorus III. (1078), who reigned until 1081, when he was deposed by Alexius I., Comnenus (q.v.), (1081-1118). This last reign was marked by the commencement of the crusades. The successors of Alexius—his son, Kalo-Joannes (1118-48), and Manuel I. (1148-80)—were able rulers, and victorious in their engagements with the Turks. Manuel's son, Alexius II., was murdered by his guardian, Andronicus (grandson of Alexius I.), who raised himself to the throne. He was the last prince of the Comnenian dynasty, and fell in an insurrection excited by his own cruelty, 1185.

After the first turbulent reign of Isaac II., who was blinded and deposed by his brother, Alexius III., who took the surname of Comnenus in 1195, the crusaders restored Isaac to the throne (1203), and also crowned his son Alexius IV.; but the restless citizens of Constantinople elected Nicolas Kanabus, who took the title of Alexius V., and pursuing the usual bloody course, put his predecessor to death.

In 1204, the French and the Venetians (collectively named *Latins*) advanced on Constantinople, and captured the city, April 12, having made themselves masters of the European provinces. The whole was divided into four parts, of which the first, including the metropolis, fell to the lot of Baldwin, count of Flanders, who was made emperor, and to whom the other participants in the expedition did fealty for their respective shares. The Venetians obtained the coasts of the Adriatic and Ægean seas, a part of

the Morea, and several islands; Bonifacius, count of Montferrat, Macedonia, and part of Greece; several dukedoms, countships, etc., were also established at Athens, Philippopolis, and other places for French knights; while a number of Greek princes, both on the mainland and in the islands, maintained their independence. In the w. of Asia Minor, Theodorus Lascaris, who had been elected emperor at Constantinople, formally transferred the seat of government to Nicæa; and finally, in the n.e. of Asia Minor, the governor of the province of Colchis, Alexius Comnenus, ruled at Trebizond with absolute authority; while one of his successors, John Comnenus, even assumed the title of emperor. At Constantinople, neither Baldwin nor his successors could strengthen the sinking empire. Baldwin himself died (1206) a prisoner in the hands of the Bulgarians. After him came his brother Henry, who ruled bravely and wisely till 1216. For the next four years, the empire was actually without a ruler, and a prey to utter anarchy. In 1221, Robert, son of Peter, count of Auxerre and Courtenay, came to the throne; and was succeeded by John of Brienne, titular king of Jerusalem (1228-37); and the latter by Baldwin II. (1237-61). During these reigns, a great part of the empire was seized by John Vatazes, successor of Theodorus Lascaris of Nicæa (1222-55). This ruler was followed in Nicæa by Theodorus II. (1255-59), whose son, Johannes, during his minority, was superseded by Michael VIII., Palæologus, who, by the help of the Genoese, captured Constantinople (July 25, 1261), and thus put an end to the Latin dynasty; though some few Latin principalities maintained themselves till the fall of the Byzantine empire.

Michael, the first of the Palæologi, a powerful prince, really endeavored to strengthen the realm; but, by his unhappy attempt to unite the Greek church with the Latin, from which it had decisively separated (1054), he gave great offense to the clergy and the people. His son, Andronicus II., who came to the throne, 1282, re-established the Greek ritual. After the death of his son and co-regent, Michael IX. (1320), Andronicus II. was compelled to divide the throne with his grandson, Andronicus III., who became sole emperor, 1328. This monarch unsuccessfully opposed the Turks, who took Nicæa and Nicomedia in 1339, and wasted the European coasts. He died in 1341. Under his son, Johannes V., the Turks first gained a firm footing in the European provinces, and spread themselves from Gallipoli (which they captured in 1357) over other districts. Sultan Murad took Adrianople, 1361, and made it the seat of government. He and his follower, Bajazet, conquered all the Byzantine territories as far as Constantinople. Manuel II., son and successor of Johannes, was besieged in Constantinople by Bajazet, who defeated an army under Sigismund of Hungary, at Nicopolis, in 1396, and compelled the Byzantine monarch to cede to the Turks one of the main streets of the city, which was saved from capture only by Timur's incursions into the Turkish territories, 1402. By this diversion Manuel recovered some portion of the Byzantine provinces; but made so little use of the occasion, that, in 1422, the metropolis was again besieged by Murad II., who, after he had overthrown the force sent to aid the emperor by Ladislaus, king of Hungary, at the battle of Varna, made Constantinople, in 1444, the limit of the domains of Johannes VI., son of Manuel, and compelled him to pay tribute. Constantine XI., brother of Johannes, bravely but fruitlessly contended against the overwhelming Turkish forces, and fell heroically in the defense of Constantinople, which was captured by Mohammed II., May 29, 1453, when the B. E. was brought to a close. The petty Latin princes who existed here and there in Greece, and the despots, Demetrius and Thomas, who ruled in the Morea, were subdued by Mohammed in 1460; while David, a member of the Comnenian dynasty, the last emperor of Trebizond, submitted in 1461.

It is almost superfluous, after this painful and bloody record of dynastic crimes and tumults, continuing century after century for upwards of a thousand years, to affirm that the history of the world never witnessed so miserable and degraded a caricature of imperial government as the B. E. affords, or to express the conviction that nature was sternly satisfied to behold it finally swept from the face of the earth, even by the hands of barbarous Turks.

The constitution of the B. E. was founded on the institutions of Diocletian and Constantine the Great, and was purely despotic. The emperors, who were consecrated by the patriarchs of Constantinople, claimed, as the true descendants of the Cæsars, a sovereignty over the west as well as the east, and styled themselves "rulers of the Romans," even after Charlemagne had founded a new dynasty. Though great influence was at various times exercised by the clergy as well as by women, courtiers, and ministers, the emperors were pure autocrats, having supreme power in all departments of government, and being themselves superior to all laws. By pompous titles, by great splendor of costume, and by a strict observance of an elaborately minute court ceremonial, as well as by the cruel penalties inflicted for any insult offered to the imperial dignity, or to the dignity of the emperor's relatives, they kept themselves sacredly apart from the people. Gradually, everything disappeared that might have been a check upon the utter despotism of the supreme power. As early as the 6th c., the consulate was absorbed into the mass of imperial honors, while the traces of the senate which Constantine had established at Byzantium, and which was composed of those on whom the emperor had bestowed the dignity of patriciate, as well as the chartered privileges of the towns, had entirely vanished in the 10th century. The privy council, to whom the conduct of the state was intrusted, was arbitrarily chosen by the emperor. The state officials were very numer-

ous, and their respective ranks carefully distinguished. They were raised far above the populace by titles and privileges, but were utterly dependent on the throne. Among these, the *domestici* (including many eunuchs), claimed the highest rank as immediate attendants on the emperor. The rank of the *curopalates*, who had charge of the four chief imperial palaces, became, in course of time, subordinate to that of the *protovestiarius*, who was invested with the highest dignity of all. The *domestici* were made commanders-in-chief of the army. Among them, the *domestici* of the east (styled, *par excellence*, *megadomestici*) held the highest rank, and finally, under the Palæologi, was considered the first civil and military officer of the realm. The provinces were ruled by governors bound to contribute certain sums to the royal revenue, which gave rise to oppressive exactions. No distinction was made between the state-revenue and the privypurse. For military service, the land was divided into districts (*themata*); and the army, down to the later times, consisted almost entirely of foreign mercenary troops, the imperial body-guard, or *spatharii*, who were mainly Germans, holding the highest rank. The admiral of the fleet was styled *megadux*. In the midst of constant internal and external disturbances, the administration of justice was grossly neglected and abused, though Justinian and other emperors earnestly endeavored to establish just laws.

**BYZANTINE HISTORIANS** are those Greek writers who have handled the history of the Byzantine empire. They are divided into three classes—1. Those whose works refer exclusively to Byzantine history; 2. Those who professedly occupy themselves with universal history, but at the same time treat Byzantine history at disproportionate length; 3. Those who write on Byzantine customs, antiquities, architecture, etc. The B. H. are far from faultless, yet, as they are the only sources of information regarding the vast empire of the east, they are invaluable to us. The most interesting and instructive among them, however, are those who confine their attention to a limited number of years, and to the events which transpired under their own observation, or in which they took part. The principal B. H. were collected and published at Paris in 36 vols., with Latin translations under the editorship of P. Philippe Labbé, a Jesuit, and his successors (1648-1711). This magnificent collection was reprinted, with additions, at Venice, 1727-33. In 1828, Niebuhr, assisted by Bekker, the Dindorfs, and others, began a *Corpus Scriptorum Historiæ Byzantinæ*, carried on till 1855, and continued in 1872 by the *Bibliotheca Græca Mediæ Ævi*.

**BYZANTINE RESCENSION**, the Greek New Testament used in Constantinople after that city became a see in the eastern church; also used as the basis of the old Slavonic version. It differs very little from the received text.

**BYZANTINES**, in numismatics, is the term applied to coins of the Byzantine empire. Byzantine coins are of gold, silver, and bronze; bear impressions distinct from those of the earlier Roman coins; and were copied in several countries where the Byzantine standard was adopted. The commercial relations of the eastern empire served to distribute its coinage over almost all the then known world. It was current in India, as well as in the N. of Europe. Recently, an increased attention has been paid to the study of Byzantine coins as aids to history.—Saulcy, *Essai de Classification de Suites Monétaires Byzantines* (Metz, 1836). See **BESANTS**.

**BYZANTIUM**, a city which stood on the Thracian Bosphorus, was first founded by emigrants from Megara in 667 B.C., and rapidly rose to importance as a seat of commerce. Its position was at once secure and enchanting; it commanded the shores of Europe and Asia, had magnificent facilities for trade, and was also encircled with rich, picturesque, and varied scenery. After a time of subjugation under Darius Hystaspes, B. was liberated from the Persian yoke by Pausanias. Along with other Grecian seaports, B. revolted from Athens in 440 B.C., but was captured by Alcibiades (408). Lysander recovered it for the Lacedæmonians in 405. Shortly afterwards, it renewed its alliance with Athens, and in 390, Thrasybulus altered its form of government from an oligarchy into a democracy. When Athens again acquired a dangerous importance as a naval power, B., in 356, leagued itself with Chios, Rhodes, and king Mausolus II., of Caria, and crippled the trade of the former city; with which, however, it again formed an alliance, through the influence of Demosthenes, in opposition to Philip of Macedon, who, in 341-340 B.C., vainly besieged Byzantium. Under Alexander the great, B. retained a certain degree of independence. For some time, B. was tributary to the Gauls, who settled in Thrace, after the death of Brennus (280 B.C.). After the second Punic war, when the Romans began to interfere in the affairs of Grecian and Asiatic cities, B. attached itself to Rome, and, retaining almost entire its former liberties, maintained also its commercial importance. In the civil war between Septimius Severus and Pescennius Niger, B. sided with the latter. It was therefore besieged by Severus, and, after a brave defense of 8 years' duration, was captured in 196 A.D., and reduced to ruin. Severus, repenting of the desolation which he had made, rebuilt a part of the city under the name of *Augusta Antonina*, and ornamented it with baths, porticos, etc. Caracalla restored to the inhabitants their ancient privileges; and in 330 A.D., under the name of New Rome or Constantinople, it was made the metropolis of the Roman empire. See **CONSTANTINOPLE**.

**BZOVIVUS**, or **BZOWSKI**, ABRAHAM, 1567-1637; a Polish Dominican, one of the most voluminous writers of his time. He was professor of philosophy and theology at Milan and Bologna. He continued the ecclesiastical annals of Baronius from 1198 to 1532.

## C

**C** THE third letter in all the alphabets derived from the Roman. It corresponds in place to the Greek gamma ( $\Gamma$ ), and had originally the same sound—viz., that of *g* in *gun*; as is expressly recorded, and as is proved by very old inscriptions, on which we read *lectiones, lecs*, for what were afterwards written *legiones, lege*. This medial or flat guttural sound of *c* was at an early period of Roman history lost in the sharp guttural or *k*-sound (see ALPHABET), and this continued to be the pronunciation of the letter *c* in Latin down at least to the 8th c. of the Christian era, not only in such words as *comes, clamo*, but also before the vowels *e* and *i*. Such Latin words as *Cicero, fecit*, are uniformly represented in Greek by *Kikero, phkeit*; and in the times of the empire, the Germans borrowed *Kaiser, keller*, from *Cæsar, cellarium*.

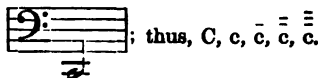
It seems difficult, at first sight, to account for the same letter having sounds so different as those heard in call and in civil. The beginning of the transition is to be found in the effect produced upon certain consonants by their standing before *i* followed by a vowel. Thus, in *nation*, *ti* has the effect of *sh*; and out of *diurnal* has sprung *journal*. In such combinations, *i* is originally a semi-vowel having the force of *y*, and it is easy to see that *tyon, dyur*, pronounced in one syllable, cannot but slide into the sibilant or hissing sounds of *shon, jur*. A precisely similar effect is produced on the *k*-sound before *ia, ie, io*; in *Lucius, Porcia*, or rather *Lukyus, Porkya*, *ky* tends to slide into a hissing sound similar to that of *ty* and *dy*. This tendency showed itself early in the Latin tongue; and in the vulgar Latin of later ages, and in the Romanic tongues that sprang out of it, it fully developed itself, so that the Italian came to pronounce *Lusia* as if written *Lutshia*. Combinations like *ceo, cea*, are little different from *cio* and *cia*, and would naturally follow the same course; and the *s*-sound being once associated with the letter *c* in these positions was gradually extended to it in cases where the *e* or *i* was not followed by a vowel.

The Anglo-Saxon alphabet resembled the Roman, from which it sprang, in having no *k*, and in always using *c* with the sound of *k*; *king* and *keen* were spelled *cynning* and *cene*. It was also without *q*, for which *cw* was used—*quick* being spelled *cwic*. By a process analogous to that described above, such Anglo-Saxon words as *ceori, ceosan* (pro. *kyori, kyoesan*), became transformed into the English *churl, chooses*. And this suggests a natural explanation of the multitude of cases where the *c* of the Latin has been transformed into *ch* in French, and has passed in this form into English—e.g., Lat. *caput*, Fr. *chef*, Eng. *chief*; Lat. *caminus*, Eng. *chimney*; Lat. *carmen*, Eng. *charm*. For as the Anglo-Saxons turned the *kari* or *kori* of the other Gothic nations into *kyori*, so doubtless the Romanized Gauls corrupted the pronunciation of the Latin *camera*, for example, into *kyamera* (compare Eng. *cart*, pro. by some *kyart*), which would then readily slide into *chambre*.

In the other Germanic alphabets, which were derived partly from the Roman and partly from the Greek, the Greek *kappa* or *k* is used almost to the exclusion of *c*, which, in German, Swedish, etc., appears only in words borrowed from the Romanic languages. See letter K.

In modern English, *c* is pronounced like *k* before the vowels *a, o, u*, and like *s* before *e, i*, and *y*; and where the sharp guttural sound has to be represented before *e, i*, and *y*, the Germanic *k* has superseded the Anglo-Saxon *c*, as in *king, keen*. In so far as mere sound is concerned, *c* is a superfluous letter in English; in every case its power could be represented either by *k* or by *s*. In the corresponding words of the several Aryan languages, we find various substitutions for *c*, thus: Lat. *calamus*, Eng. *halm* (stalk), Rus. *soloma*; Lat. *cord*, Eng. *heart*, Rus. *serdise*; Lat. *collum*, Ger. *hals* (neck); Lat. *acor* (sharp); Fr. *aigre*, Eng. *eager*; Lat. *duc* (lead or draw), Ger. *zog*, Eng. *tug*; Gr. *pepo*, Lat. *coquo*, Eng. *cook*; Lat. *dichus*, Ital. *ditto*. *C* sometimes disappears before *l* and *r*; thus: Gr. *kleo* (to sound one's fame, allied to *kaleo*, to call or shout), Lat. *laudo*, to praise, Ger. *laut*, voice, Eng. *loud*, old Ger. *hlud*, fame (hence *Hludwig* or *Clodowig*, *Clovis*, *Louis*).

*C*, in music, is the name of one of the notes of the gamut. The scale of *C* major has neither flats nor sharps, and therefore is called the natural scale. The different octaves of the gamut, beginning with *C*, are called by the Germans the great, small, one-stroked, two-stroked, etc., beginning with



*C* is also the sound on which the system of music is founded, and from which the mathematical proportions of intervals are taken; that is, a string of a given length sounding *C*, when divided into certain proportions, is made to produce harmonically the intervals of the different fundamental chords.

**C MAJOR**, the first of the twelve major keys in modern music; being the natural scale, it has no signature.

**C MINOR**, the tonic minor of C major, has three flats for its signature—viz., B flat, E flat, and A flat.

**CAABA.** See **KAABA**.

**CAA'ING WHALE**, *Globicephalus deductor*, an interesting cetaceous animal, which has been very generally included by naturalists in the genus *dolphinus* with dolphins (q.v.) and porpoises (q.v.), being named by some *dolphinus melas* (Gr. black), by others *D. globiceps*, from the round form of its head, but which has recently been separated from the true dolphins, either as a species of porpoise (*phocæna*), or as the type of a distinct genus, *globicephalus*, principally characterized by the rounded muzzle, and the convex and rounded top of the head. The general form of the animal is not unlike that of the common porpoise, but it is much larger, being from 16 to 24 ft. in length. The body is thick, its circumference at the origin of the dorsal fin, where it is greatest, being rather more than 10 ft., tapering towards the tail, which is deeply forked. The pectoral fins are remarkably long and narrow, fully 5 ft. in length, differing very much in this respect from those of every other known cetaceous animal. The whole number of vertebrae is 55. The color is black, with a white streak from the throat to the vent; and the skin is beautifully smooth, shining like oiled silk.

The whale feeds on cod, ling, and other large fishes, but also to a great extent on cephalopodous mollusca, the cuttle-fish, indeed, seeming to be its principal food. It is the most gregarious of all the cetacea, great shoals or herds being usually seen together in the northern seas which it inhabits. These herds exhibit the same propensity with flocks of sheep, when pressed by any danger, to follow their leaders, so that when they are hemmed in by boats, if one break through to the open sea, all escape; but if one is driven ashore, the rest rush forward with such blind impetuosity as to strand themselves upon the beach, where they become an easy prey and rich prize to their pursuers. The common name is derived from the Scotch word *caa*, meaning "to drive."

**CAB.** See **COACH**.

**CABAL'**, a term employed to denote a small, intriguing, factious party in the state, and also a union of several such, which, for political or personal ends, agree to modify or sacrifice their principles. The word was used to describe an English ministry in the reign of Charles II., the initials of whose names composed **CABAL**—viz., Clifford, Ashley, Buckingham, Arlington, and Lauderdale. This was not the origin of the word, however, as some have supposed; but merely the ingenious application of a word previously in use, and which appears to have been derived from the French *cabale*, possessing a similar signification.

**CABALA.** See **CABBALA**.

**CABALLERO**, **FERNAN**, the nom-de-plume of **CECILIA BÖHL VON FABER**; 1797-1877; b. Switzerland. She was educated in Germany, but in 1818 accompanied her father to Spain, and soon became enthusiastically attached to her adopted country. She was married three times, her last husband being a lawyer named Arrom. Her first novel, *La Gaviota*, was published 1849, and was followed by many others, the chief of which are: *The Alvarada Family*, *Clemencia*, and *Elia*. She also published the first collection ever made of Spanish popular tales and poems, *Cuentas Poesias Populares Andaluces*, 1859. Her principal novels have been translated into most European languages.

**CABANEL**, **ALEXANDRE**, 1823-89; a French painter who occupied a place between the old classical and the modern realistic schools, was born in Montpellier. He studied under Picot and exhibited in the *Salon* of 1844, "The Agony of Christ in the Garden of Olives." In 1845 he received the second grand prize for painting, and from 1845 to about 1850 pursued his studies in Rome. Returning to France he exhibited, 1850-53, a "Saint John," "The Death of Moses," and other works. He obtained a second class medal in 1852; a first class medal in 1855 for "The Christian Martyr"; the medal of honor in 1865 at the *Salon* of 1865 for his portrait of Mme. de Ganay; in 1863 succeeded Horace Vernet as member of the Académie des Beaux Arts, and at the end of the year was made professor in that institution. After 1860 he made a specialty of portrait painting, but among later imaginative works were "Nymph carried off by a Faun" (1871), "The Birth of Venus," "Phædra" (1880); "Portia" (1884).

**CABANIS**, **PIERRE JEAN GEORGES**, a French physician, philosophical writer, and partisan of Mirabeau in the revolution, was b. at Cosnac, in the department of the Charente-Inférieure, 1757. When he had completed his studies in Paris (1778), he went to Warsaw, in the capacity of secretary to a Polish magnate. On his return to Paris, he was for some time engaged in literary pursuits, from which he turned his attention to an earnest study of medicine. At the outbreak of the revolution, he attached himself to the liberal side, but detested the cruelties which followed. For Mirabeau, whose opinions he received, he wrote a work on national education, which was published after the death of that great orator (1791). C. was one of the council of five hundred, afterwards member of the senate, and administrator of the hospitals of Paris. He died May 5, 1808. His chief work, *Rapports du Physique et du Moral de l'Homme*, completed in 1802, gained its author a considerable reputation as a writer and philosopher.

**CABARET** (Fr., *cabaret*, probably a contraction for *cabanaret*, from *cabane*, hut.) A tavern; a public house where liquors are retailed.

**CABARRUS**, a co. in s.w. North Carolina, on the N. C. railroad, watered by Rocky river; 89½ sq.m.; pop. '90, 18,142, inclu. colored. Soil moderately fertile, producing corn, wheat, cotton, etc. Co. seat, Concord.

**CABARRUS, FRANCISCO DE**, 1752-1810; a Spanish financier, originator of a bank and company for trade with the Philippine islands. He was one of the council of finance under Charles III., and proposed many reforms. Under Charles IV. he was accused of embezzlement and imprisoned, but soon after was released and made a count. Bonaparte made him a minister of finance, in which office he died. His daughter Thérèse, under the name of Mme. Tallien, afterwards princess of Chimay, was conspicuous in the closing days of the French revolution of 1789.

**CABATUAN**, a city of the province of Iloilo, on the island of Panay, one of the Philippines. It is situated on the banks of the river Tiguin, which so abounds with crocodiles that fishing is unsafe.

**CABAZERA**, capital of the province of Cagayan, island of Luzon, Philippines. Tobacco is grown very extensively in the province, and its manufacture affords employment to large numbers of people.

**CABBAGE**, *Brassica oleracea*, a plant in most general cultivation for culinary purposes in Europe and many other countries, cultivated also to a considerable extent for feeding cattle. It is a native of the rocky shores of Britain and other parts of Europe, more plentiful on the shores of the Mediterranean than in more northern latitudes, and in its wild state is generally from a foot to two feet high. This plant has been cultivated in Europe from time immemorial; it has likewise been cultivated from an early period in gardens and about villages in India. Few plants show so great a tendency to vary in their form through cultivation; and among the varieties of this one species are reckoned several of our most esteemed culinary vegetables, such as kale (q.v.) or greens, borecole, colewort (q.v.), savoy (q.v.), kohlrabi (q.v.), cauliflower (q.v.), and broccoli (q.v.)—plants which differ much in their appearance and in the particular qualities for which they are valuable, both from each other and from the original wild plant.

The wild C. has smooth sea-green leaves, waved and variously indented; the boiling of the leaves, or their forming close heads at a certain stage of the growth of the plant, so that the inner leaves are blanched, is peculiar to those cultivated varieties which commonly receive the name of cabbage.

The ordinary varieties of C. are often called by the general name of *white C.*, to distinguish them from the *red C.*, which is of a deep brownish-red or purplish color, and is chiefly used for pickling, for which purpose it is much esteemed. The *tree C.*, or *cove C.*, is a variety cultivated for cattle, especially in the Channel islands and the n. of France, of which the leaves do not close together into compact heads, but which is remarkable for its great height—reaching, when it is in flower, 10 ft. on rich soils—and for its branching stem. The stems of this kind are sometimes used as stakes for pease, and even as cross-spars for thatched roofs. The *Portugal* or *tranzuda C.*, also known as *cove tronchuda*, is a variety remarkable for its delicacy, and for the large midribs of its leaves, which are often used like sea-kale. It is an article of luxury like cauliflower, and requires a somewhat similar cultivation.—Cabbage-seed is sown either in spring or autumn, and the seedlings transplanted in rows at distances of two feet or upwards, according to the size of the variety. They are often planted closer, and the alternate plants cut young for open greens, for which the sprouts that arise from the stem of some varieties after the head has been cut off are also used. Cabbages require a rich, well-manured soil, and the earth about the roots ought to be often stirred. By sowing and planting at different dates and of different varieties, a succession is secured in the garden; and when winter approaches, part of the principal crop may be taken up and laid in a sloping position, so that only the heads are above the earth, in which way they are generally preserved without injury. In some places, cabbages are completely buried in the earth, the plants not being allowed to touch each other; and this method succeeds well in peaty or sandy soils.

The C., considered as food, contains more than 90 per cent. of water, and therefore cannot be very nutritious: 100 parts of the ordinary C. consist of

Extractive.....	2.84
Gummy matters.....	2.89
Resin.....	0.05
Vegetable albumen.....	0.29
Green fecula.....	0.63
Water and salts.....	93.80

The digestibility of C. varies according as it is partaken of raw or boiled; thus, raw C. alone is digested in 2½ hours; raw C., with vinegar, in 2 hours; and boiled C. takes 4½ hours. Immense quantities of cabbages are used in Germany as *sauer kraut* (q.v.).

**CABBAGE BARK.** See ANDIRA.



**CABBAGE BUTTERFLY**, a name common to several species of butterfly, the larvæ of which devour the leaves of cruciferous plants, especially of the cabbage tribe, and are popularly known as cabbage-worms or kale-worms. The large C. B., or large white garden butterfly (*pontia brassica*, or *pieris brassica*), is one of the most common of British butterflies. It is white; the wings tipped and spotted with black. The wings, when expanded, measure from 2½ to 3 in. across. The antennæ terminate in an ovoid club. The female lays her eggs, which are conical and bright yellow, in clusters of 20 or 30, on the leaves of the plants which are the destined food of the caterpillars. The caterpillars, when fully grown, are about 1 in. or 1½ in. long, and are excessively voracious, eating twice their own weight of cabbage-leaf in 24 hours. When full grown, they suspend themselves by their tails, often under ledges of garden-walls, or similar projections, and are metamorphosed into shining pale-green chrysalids, spotted with black, from which the perfect insect emerges, either in the same season or after the lapse of a winter—no longer to devour cabbage leaves, but to subsist delicately upon honey, which it sucks from flowers.—See INSECTS.—The small C. B., or small garden white butterfly, sometimes called the turnip butterfly (*pontia* or *pieris rapæ*), very much resembles the large C. B., but the expanse of the wings is only about 2 inches. The eggs are laid singly on the under side of the leaves of cabbages, turnips, etc., and the caterpillars, which are of a velvety appearance, pale green, with a yellow line along the back, and a yellow dotted line on each side, sometimes appear in great numbers, and prove very destructive. They bore into the hearts of cabbages, instead of merely stripping the leaves, like those of the last species, and thus are a greater pest, even when comparatively few. The chrysalis is of a pale reddish-brown color, freckled with black.—Another species, common in Massachusetts, a white butterfly, *pontia oleracea* (Harris), deposits its eggs in cabbage, turnip, and radish beds, and the caterpillars, which are greenish in color, are very destructive.—The multiplication of these insects is generally prevented by small birds and by insects of the *ichneumon* (q.v.) tribe, which lay their eggs in the caterpillars, that their own larvæ may feed on them. See ILLUS., BUTTERFLIES, ETC.

**CABBAGE FLY**, *Anthomyia brassica*, a fly of the same family with the house-fly, flesh-fly, etc., and of which the larvæ or maggots often do great injury to the roots of cabbages, and sometimes to those of turnips. It is of the same genus with the fly generally known as the turnip fly (q.v.), and also with the potato fly (q.v.), beet fly (q.v.), etc. It is about one fourth of an inch in length, and half an inch in expanse of wings; of an ash-gray color; the male having a silvery gray face, and a long black streak on the forehead; the female, a silvery-white face, without any black streak; the abdomen of the male is linear, that of the female terminates conically; the eyes of the male nearly meet on the crown, those of the female are distant, with a broad black stripe between them. The larva is very similar to that of the flesh-fly—yellowish white, tapering to the head, which has two black hooks. The pupa is rust-colored and horny.

**CABBAGE MOTH**, *Mamestra* or *Moctua brassica*, a species of moth, the caterpillar of which feeds on cabbage and turnip leaves, and is sometimes very destructive. The caterpillar is greenish-black, and changes to a brown pupa in autumn. The perfect insect is of a rich mottled-brown color, the upper wings clouded and waved with darker brown, and having pale and white spots, a yellowish line near the fringe, the fringe dotted with black and ocher, the under-wings brownish and white.

**CABBAGE PALM**, or **CABBAGE TREE**, a name given in different countries to different species of palm, the great terminal bud of which—the palm cabbage—is eaten like cabbage. The C. P. of the West Indies is *areca oleracea*. The southern states of America have also their C. P. or cabbage tree, otherwise called the palmetto (*chamærops palmetto*). See ARECA; PALMETTO; PALMS.

**CABBALA** (from Heb. *kibbel*, to receive), the received doctrine, by which is not to be understood the popularly accepted doctrine, but that inner or mystical interpretation of the law which the Cabbalists allege that Moses received from God in the mount, and subsequently taught to Joshua, who in his turn communicated it to the 70 elders, and which has ever since been the treasure of the select Jews. Since the 12th c., the study of this secret lore has gradually resulted in a distinct school and literature, the elements of which, however, are already visible in the Macedonian epoch, and the real or historical source of which is to be found in the eastern doctrine of emanation. In Philo, in the Talmud, etc., we certainly find theologico-philosophical conceptions, which were at a later period taken up and modified; but the first book on cosmogony is *Jezirah*, a production of the 7th c., attributed to Akiba. After the second half of the 12th c., the Cabbalistic doctrines, which had at first been confined to such high themes as God and creation, began to include exegesis, ethics, and philosophy, and so became a kind of mystical religious philosophy. The numerous Cabbalistic writings composed during the three subsequent centuries, professed to teach the secret or mystical sense of Holy Writ, and the principles on which it is grounded, the higher meaning of the law, as well as the method of performing miracles, by the use of divine names and sacred incantations. The Cabbalists, moreover, prepared books, which they attributed to the oldest authorities—for instance, *Sohar*, a work written in Aramaic, during the 13th c., and fathered upon Simeon-ben-Joachai, a scholar of Akiba. This became the Bible of the Cabbalistic

neophytes. The chief opponents of the Cabbalists were the philosophers, and in part the Talmudists. Towards the close of the 16th c., the Cabbalistic wisdom, which by that time had degenerated into magic and word-juggling, received a new impulse from its teachers in Palestine and Italy. Since the time of Reuchlin, many Christian scholars have investigated the subject.

**CABECA DE VACA.** See **NUÑEZ ALVAR.**

**CABELL**, a co. in s.w. West Virginia, on the Ohio river and the Chesapeake and Ohio railroad, watered by Guyandotte river. It is hilly, but fertile, producing corn, tobacco, etc. Co. seat, Huntington. Area, 300 sq. m. Pop. '90, 23,595.

**CABELL**, EDWARD CARRINGTON, 1816-96; b. Richmond, Va.; lawyer, educated at the University of Virginia; member of congress from Florida 1845-53; secured appropriation for the fortification of Key West and the Tortugas; served in the confederate army; and wrote a history of Florida.

**CABELL**, JAMES LAURENCE, 1818-89; b. Nelson co., Va.; physician, graduated at the University of Pennsylvania; studied medicine there, in Baltimore, Philadelphia, and Paris; elected professor of anatomy and surgery in the University of Virginia; in charge of the confederate military hospitals during the civil war; and subsequently was president of the national board of health.

**CABEIRI**, divinities anciently worshiped in Egypt, Phœnicia, Asia Minor, and Greece. The ancients have left us very obscure notices of the C., and learned men have been unable to reach any satisfactory conclusions with regard to them and their worship. It is certain that the worship had both its mysteries and its orgies, and it appears also that the C. were amongst the inferior divinities, and regarded as dwelling upon the earth, like the Curetes, Corybantes, and Dactyles, and were probably representatives of the powers of nature. See **SAMOTHRACE**.

**CABER**, Tossing the, a Scottish athletic exercise or feat, in which a large beam or young tree, heavier at one end than the other, is held perpendicularly against the chest, small end downward, and tossed so as to fall on the heavy end and turn over, the farthest toss and straightest fall winning. Competitions where the powers of the opponents are unknown are generally started with a caber of 24 or 25 ft., from which the thick end is sawn off by degrees, until the proper length is got at. The thin end, held in the hand, should be not more than 8 ins. in diameter; the average length of a good larch caber is about 21 ft.

**CABÉS OR KHABS**, GULF OF (ancient *Syrtis Minor*), an inlet of the Mediterranean sea, lying between the islands of Kerkenna and Jerba, on the n.e. coast of Africa, in lat. about 34° n., and long. from 10° to 11° east. The town of Cables (ancient *Tacape*) stands at the head of the gulf.

**CABET**, ÉTIENNE, a notable French communist, was b. at Dijon, Jan. 2, 1788, and educated for the bar, but turned his attention to literature and politics. Under the restoration, he was one of the leaders of the Carbonari (q.v.), and in 1881 was elected deputy for the department of Côte d'Or. Soon afterwards, he published a *History of the July Revolution* (1832), started a radical Sunday paper, *Le Populaire* (1833), and, on account of an article in this paper, was sentenced to two years' imprisonment, but escaped to London. Here he wrote brochures against the July government, and began his communistic studies. After the amnesty, 1839, he returned to Paris, and published a *History of the French Revolution* (4 vols., 1840), bestowing great praise on the old Jacobins. He attracted far more notice by his *Voyage en Icarie* (1840), a "philosophical and social romance," describing a communistic Utopia. The work obtained great popularity among the working-classes of Paris. C. next proceeded to turn "his philosophical romance" into a reality, and published (1847) in his journal, *Le Populaire*, the statutes for the formation of an "Icarian colony" on the Red river in Texas; inviting his followers to emigrate. The first division sailed on the 2d Feb., 1848, but a short experience convinced them that Texas was anything but a Utopia. Their complaints reached Europe, but did not deter C. from embarking at the head of a second band of colonists. On his arrival, he learned that the Mormons had just been expelled from Nauvoo, in Illinois, and that their city was left deserted. The Icarians established themselves there in May, 1850. C. now returned to France, to repel the accusations against his probity which had been circulated during his absence, and to obtain a reversal of the judgment which had been formally pronounced against him, 30th Sept., 1849. Having succeeded in this, he went back to Nauvoo, where he governed, as a sort of dictator, his petty colony, until 1856, when he was deprived of his office, and obliged to flee to St. Louis, where he died 9th Dec. of the same year. C. was a shallow thinker, and a weak ruler.

**CABIN**, an apartment in a ship for officers or passengers. In a passenger steamer the cabin is divided into state-rooms. In an ordinary merchant ship the cabin is the apartment occupied by the master of the vessel. In a man-of-war it is the quarters of the flag officer and of the commanding officer, the apartments of the other officers being called the ward-room, steerage and warrant-officers' quarters. The word cabin in the English service is synonymous with state-room as used in the United States.

**CABINDA**, or **KABINDA**, the capital of the Congo district of the province of Angola. Since 1885 it has developed considerably. *Ngayo* is the native name for the country and its people, who are governed locally by petty chiefs, called kings. Cabinda is also the name of the harbor near by.

**CABINET** (Ital. *gabinetto*), a small chamber set apart for some special purpose, such as the conservation of works of art, antiquities, specimens of natural objects, models, and the like. From signifying the chamber in which such collections are contained, the term C. has recently come to be employed by us, in imitation of the French, to signify the collections themselves, and this even when they fill many rooms or galleries. It often means a small room appended to a larger one, when it is also called an ante-room or retiring-room; and sometimes a small case or frame for the display and preservation of coins, etc.—**CABINET PICTURE**, a picture suited for a cabinet or small room. C. pictures are generally small in size, highly finished, and thus suited for close inspection.

**CABINET** (see **MINISTRY**), in political affairs, signifies the heads of departments who are the immediate advisers or counselors of the chief executive. In the U. S. government the cabinet consists of the secretaries of state, treasury, war, navy, interior, and agriculture, the attorney-general and the postmaster-general. They meet whenever desired by the president, but not publicly. No minutes are kept of their doings, nor are the names of those present recorded. The president presides; and he may at any time require in writing the opinion of any of the members upon matters concerning his department. But the C. has no responsibility, as that rests with the president alone, and, contrary to the English system, the U. S. C. ministers must not have seats in congress. A list of all the Cabinets in this country to 1892, will be found under **UNITED STATES**.

**CABLE** is either a large rope, or a chain of iron links, chiefly employed on shipboard to suspend and retain the anchors. Rope cables are made of the best hemp, twisted into a mass of great compactness and strength. The circumference varies from about 8 in. to 26. A certain number of yarns are twisted to form a *lissum*; three lissums are twisted in an opposite direction to form a *strand*; and three strands are twisted (in the same direction as the yarns in a lissum) to form a *cable*. The number of yarns in a C. of given size is not always alike, because the yarns slightly vary in thickness; but the following is one among many tables which have been prepared relating to cables of 120 fathoms, and of the usual degrees of thickness:

Inches Circumference.	YARNS.	Lbs.
8.....	= 48.....	= 192
6.....	= 174.....	= 696
9.....	= 898.....	= 1572
12.....	= 699.....	= 2796
15.....	= 1093.....	= 4372
18.....	= 1574.....	= 6296
20.....	= 1943.....	= 7772

Some cables are made with four strands, but three is the common number. If a C. be twisted too much, it is stiff; if too little, it is weak. The strength of a C. of 18 in. circumference is found to be about 60 tons; and for other dimensions, the strength varies according to the cube of the diameter. On shipboard, cables receive the names of *chief* cables, *bower* cables, etc., according to the anchor to which they are attached. During the great war ending in 1815, the largest ships in the British navy carried ten cables, most of which were about 2 ft. or a little more in circumference. Although ships seldom anchor at a greater depth than 40 fathoms, it is not deemed safe to trust the anchor to one C. of the usual length; two are spliced together at the ends. The hempen cables now made are generally 101 fathoms; but 100 fathoms in practical seamanship denotes "a cable's length," and is really the length of a chain cable.

**CHAIN CABLES** are made of links, the length of each of which is generally about six diameters of the iron of which it is made, and the breadth about three and a half diameters. In government contracts, chain cables are required to be made in 13½ fathoms lengths, with one swivel in the middle of every alternate length, and one joining-shackle in each length. The stay-pins, to strengthen the links, are of cast iron. The bar or rod from which each link is made, has the two ends cut diagonally; it is bent into the form of a nearly complete oval ring; and then the two ends are joined and welded, the stay-pin being at the same time introduced at the proper place. Besides the ordinary links, there are end-links, joining-shackles, splicing-tails, mooring-swivels, and bending-swivels. The sizes of chain cables are denoted by the thickness of the rod-iron selected for the links. The following table gives certain ascertained quantities concerning the cables in ordinary use:

Thickness of Iron.	Weight of Stay-pin.	Weight per Fathom.	Breaking Strain.
½ inch.	½ oz.	18½ lbs.	6 tons.
1 "	3½ "	54 "	24 "
1½ "	12 "	121 "	60 "
2 "	28 "	215 "	99 "
2½ "	40 "	272 "	126 "

**CABLE, ATLANTIC.** See TELEGRAPHY, SUBMARINE.

**CABLE, GEORGE WASHINGTON**, author, was b. in New Orleans, La., Oct. 12, 1844. Thrown on his own resources while a youth, he earned his living as a clerk, but in 1863 entered the confederate army. At the close of the war he tried different kinds of work, including surveying, but having contracted malarial fever, was an invalid for two years, and during this time contributed some articles to the *New Orleans Picayune*. On recovering his health he became clerk in a cotton house, but some sketches of Creole life, printed in *Scribner's Magazine*, and republished in 1877 as *Old Creole Days*, were received with so much enthusiasm in the literary world that in 1879 he gave up business for authorship, and a few years after settled in Northampton, Mass. His works include *The Grandissimes*, (1890); *Madame Delphine* (1881); *Dr. Sevier* (1888); *The Creoles of Louisiana* (1884); *The Silent South* (1885); *Bonaventure* (1888); *Strange True Stories of Louisiana* (1890); *John March, Southerner* (1894). As a public reader, a lecturer and writer on prison reform and on Sunday school work, he was highly successful. He became editor of *Current Literature*, New York, in 1896.

**CABLE-MOLDING**, in architecture, is a molding cut in the form of a rope, the twisting being prominently shown. It was much used in the later Norman style.

**CARLING**, the molding by which the hollow parts in the flutes of columns and pilasters in classical architecture are often partially filled. The C. seldom extends beyond the third part of the shaft from the ground.

**CABOCHED**, or **CABOSSED**, an heraldic term, from the old French word *caboche*, the head. When the head of an animal is borne, without any part of the neck, and exhibited full in face, it is said to be caboched.

**CABOCHIENS**, certain butchers of Paris, named from their chief, Jean Caboche, who were partisans of John of Burgundy against the Armagnacs. In 1418, their outrages provoked the people of Paris to rise against them.

**CABOOSE**, or **CAMBOOSE** (Danish, *kabyse*, a cook's room in a ship; Ger. *kabuse*, a little room), is the name of the kitchen or cook-room in a merchant-ship. In coasting-vessels, the term is applied to a portable cast-iron stove on the deck, where food is cooked.

**CABOT**, the name of two Venetians, father and son, both celebrated as navigators and discoverers.—GIOVANNI CABOT, or CABOTTO, the father, whose business compelled him to reside much in Bristol, was appointed by Henry VII., Mar. 5, 1496, to the command of a squadron of five vessels on a voyage of discovery in the Atlantic ocean. In this expedition he was accompanied by his sons Ludovico, Sebastiano (born at Bristol, 1477), and Sanzio. On the 24th of June, 1497, the coast of Labrador, North America, was sighted. The merit of this discovery has been generally ascribed to the navigator's second son, Sebastian C., the most scientific of the family; but an extract from a chart preserved by Hakluyt mentions the father before the son. The expedition returned in Aug., 1497. In 1498, a second was made, with what results we do not know; and in 1499, a third to the gulf of Mexico. About this time, Giovanni, the father, appears to have died, and we hear no more of *Sebastian* till 1512, when he entered the service of Ferdinand, king of Spain. During the year 1515, he was engaged in revising maps and charts in connection with his profession, and in planning an exploration of the n.w. passage to Asia, which, however, was laid aside on account of the death of Ferdinand in 1516. C., who seems to have been no favorite with the Spanish courtiers, was now subjected to a series of contemptible insults. This usage induced him to return to England, and in 1517, he was appointed by Henry VIII. to the command of an expedition to Labrador. He reached lat. 67½° n., and entered Hudson's bay, where he gave names to several places; but the expedition proved on the whole a failure, on account of the cowardice or malice of his vice-commandant, sir Thomas Perte. C. now entered again into the Spanish service, was made pilot-major of the kingdom by Charles V., and commanded an expedition which examined the coast of Brazil and La Plata, which he attempted to colonize. He discovered the river Uruguay and the Parana, and sailed up the Paraguay to the place where the city of Asuncion now stands. He had planned to go on to the Moluccas by way of the Straits of Magellan, but his provisions failed him. In 1530, having built a fort and left a garrison at Espirito Santo on the Parana, he returned to Spain, and resumed his old situation; but in 1548 he once more betook himself to England, where he was well received by king Edward VI., who made him inspector of the navy, and gave him a pension. To this monarch he seems to have explained the variation of the magnetic needle in several places, which he was among the first, if not the very first, to notice particularly. In 1563, C. was the prime mover and director of the expedition of merchant adventurers which opened to England an important commerce with Russia. He died in London in 1557. See *Harrisse's Jean et Sebastian Cabot* (1882), and *The Discovery of North America* (1892).

**CABOT, GEORGE**, 1751-1823; b. Mass.; in early life a ship captain, but in 1776 chosen to the Massachusetts provincial congress. He was also in the state constitutional convention, and in 1789 was chosen U. S. senator. He was offered but declined the position of secretary of the navy. His last political act was to preside over the Hartford convention in 1814.

**CABOTVILLE.** See CHICOPPEE.

**CABOTZ.** See CUSO.

**CABRAL**, or **CABRERA**, PEDRO ALVAREZ, abt. 1460-1526; discoverer of Brazil, descended from an old and patrician Portuguese family. Nothing is known of his early life, save the fact that he must have recommended himself by talent and enterprise to king Emanuel of Portugal, who, after the first voyage of Vasco da Gama, appointed C. to the command of a fleet of 13 vessels, carrying 1200 men, and bound for the East Indies. On the 9th Mar., 1500, he sailed from Lisbon. To avoid the inconvenience of being becalmed on the coast of Africa, he took a course too far westerly, fell into the South American current of the Atlantic, and was carried to the unknown coast of Brazil, of which he claimed possession for the king of Portugal, April 22, 1500, naming the new country "Terra da Santa Cruz." After sending home one vessel to bear news of this great accidental discovery, C. sailed for India; but on the 29th of May, four of his vessels foundered, and all on board perished, including Diaz, the great navigator; and soon afterwards three more vessels were lost. C. therefore landed at Mozambique, on the e. coast of Africa, of which he first gave clear information, and also discovered (Aug. 23) the Antschedives Islands, of which he described correctly the position. Hence he sailed to *Calicut*, where, having made the terror of his arms felt, he was permitted to found a factory; entered into successful negotiations with native rulers, and thus established the first commercial treaty between Portugal and India. He returned from India, bringing with him a considerable booty, and arrived in the port of Lisbon, July 23, 1501. It appears probable that the king was dissatisfied with the results of the expedition (although it had annexed Brazil to the crown of Portugal), for subsequently we find no mention made of C. among other discoverers. At the request of C., Sancho de Toar wrote a description of the coast of Sofala. See *Descobrimento do Brasil*, by Capistrano de Abreu (1883); also *Decadas das Indias* by Barros.

**CABRE'RA**, a small island in the Mediterranean, lying off the southern point of Majorca. It is about 8 m. in length and breadth, with an irregular coast, and is little else than a barren calcareous rock. The only interest attached to C. is, that during the war in the Peninsula it formed a Spanish depot for French prisoners, who were crowded in thousands into the desolate spot, and treated with great barbarity; of which an account is given in a popular work, entitled the *Adventures of a French Sergeant*.

**CABRE'RA**, DON RAMON, the boldest leader of the Carlist party in Spain, was b. at Tortosa, in Catalonia, 31st Aug., 1810. The death of Ferdinand, in 1833, gave the signal for a civil war, and first brought C. into notice. Placing himself at the head of some guerilla troops, he joined the absolutists, or partisans of Don Carlos, and by his vigilance, energy, and daring soon rose to be second in command in the Maestrazgo district. Throughout Aragon and Valencia his name became a by-word for cruelty. After penetrating as far s. as Andalusia, his forces were completely routed by the royal troops, on the borders of Aragon, and he himself, severely wounded, escaped with difficulty into the woods. It was now rumored that C. was dead, when all at once he reappeared at the head of 10,000 foot and 1600 horse. Invading the province of Valencia, he overthrew the royal army at Buñol, 18th Feb., 1837, and again on the 19th Mar. at Burjasot; but was in his turn vanquished at Torre Blanca, and once more compelled to seek a hiding-place. Shortly after, he reopened the war with fiery energy. Madrid itself was threatened by C., who, about this time, received the title of count of Morella for his vigorous defense of the fortress of that name, and was also appointed governor-general of Aragon, Valencia, and Murcia. The Carlists now believed that the triumph of absolutism was approaching, when the treachery of the Carlist gen., Marotto, changed the whole aspect of affairs, and Don Carlos fled from Spain. C. held out until Espartero forced him to quit the country in the summer of 1840. He then entered France, where he was taken prisoner, and confined for a short time in the fortress of Ham. In 1845, he strongly opposed Don Carlos's abdication of his rights. On the outbreak of the French revolution in 1848, he renewed the struggle on behalf of absolutism in Spain; but the adventure proved a miserable failure, and on the 17th Jan., 1849, he recrossed the Pyrenees, to live in retirement. He afterwards married a wealthy English lady, Miss Marianne Catherine Richards. When Alphonso was proclaimed king of Spain in 1875, C. advised the Carlists to submit to him, chiefly because he was "a good son of the church." He died 24th May, 1877.

**CABUL'**, a river in Afghanistan, rises in lat. 34° 21' n., and long. 68° 20' e., on the southern declivities of the Hindu Kush or Indian Caucasus. Its source is 8400 ft. above the level of the sea; and an eastward run of 820 m., with a fall of about 7500 ft., along n. Afghanistan, through the Khyber mountains, and across Peshawur, carries it into the Indus, opposite to Attock, in the Punjab. The point of confluence marks the head of navigation on the main stream, while the tributary itself is practicable about 60 m. upwards for craft of 40 or 50 tons. By means, therefore, of the two taken as one line, there exists an available communication of about 1000 m. between the Khyber mountains and the Indian ocean. The C. washes the cities of Cabul, Jelalabad, and Dobundee.

**CABUL'** is the name given to that part of Afghanistan (q.v.) which lies s. of the Hindu Kush, and is drained by the Cabul river. It extends from the s. of Ghiznee to the Hindu Kush, and from Bamian (q.v.) to the Khyber pass. This region has long occupied a prominent position in the world. Through it, as the passage from Persia to India, Alexander the great marched to complete his eastern conquests; from it issued

Mahmoud of Ghiznee, the first Mohammedan invader of Hindustan.

The city of Cabul, from which the surrounding territory takes its name, has about 70,000 inhabitants, and stands in lat.  $34^{\circ} 30'$  n., and long.  $69^{\circ} 8'$  e., near the point where the river, here crossed by three bridges, ceases to be fordable. Elevated about 6400 ft., and overtopped, within a short distance to the n., by pinnacles of the Hindu Kush, about 14,000 ft. higher than itself, C. has a severe winter, and a temperate summer, ranging from  $75^{\circ}$  to  $85^{\circ}$  F. On the outskirts of the city are extensive machine shops, including a plant for electric light, and a rifle and cartridge factory. This is connected by rail with a marble quarry about 10 miles distant. The water supply of the city is abundant, and generally good. The streets are badly paved, and the houses, which are generally only two or three stories high, are built of sun-dried bricks and wood, and have flat roofs. Near the outer edge of the city are the tombs of the sultan Babar. Formerly the city was enclosed by an earthen wall. The inhabitants are Mohammedans of the Sunni sect, they are not very dark in color, are strong, well-built and have a Jewish cast of countenance. The language of the common people is the Pushtu dialect, but the higher classes speak the Persian language. The city has considerable commercial importance and it is regarded as a very important strategic point. In the days of sultan Babar, C. was the capital of the Mogul empire. In more recent times it has witnessed some of the most momentous events in Anglo-Indian history. In 1839 it was taken by the British; in 1841 it was lost through a treacherous outbreak, which led (8th Jan., 1842) to the massacre of about 4000 soldiers and 12,000 followers; and, finally, after being recovered by gen. Pollock in the same year, it was abandoned, its bazars and public buildings having previously been burned to the ground.

After the death of Dost Mohammed, ameer of Afghanistan, Shere Ali, the son whom he had selected as his heir, had to fight for the possession of C. with Afzul Khan, his elder brother, and the son of the latter, Abdulrahman, who had married a daughter of the khan of Bokhara. Shere Ali was at first unsuccessful. On May 21, 1866, Afzul entered C. in triumph, and was proclaimed ameer of Afghanistan. He applied to sir John Lawrence, the Indian viceroy, to recognize him, but the request was declined on the ground that Shere Ali remained in possession of a large part of Afghanistan. At the death of Afzul his brother Azim took the title of ameer, not of Afghanistan, but of C. and Candahar. In the end of 1868, Shere Ali, aided by his son Yakoob, obtained possession of C., which became again the capital of Afghanistan. At the close of the war of 1878-79, Yakoob, ameer of Afghanistan, agreed that there should be an English resident at Cabul. War recommencing, Yakoob abdicated, and Abdurrahman, son of Afzul, became ameer.

**CACA'O.** See COCOA.

**CACCIA** (Italian), music accompanied by horns. *Alla caccia*, in the hunting style.

**CA' CERES**, a t. of Spain, capital of the new province of Caceres, is situated on a river of the same name, about 25 m. w. of Truxillo, in a rich agricultural district. It is famous for its bacon; has manufactures of linen, woolens, leather, hats, soap, etc.; dye-works and flour-mills, and a large trade in the produce of the district. It is the *Castra Cæclia* of the Romans, and many relics of its antiquity are still found. It is rich in architecture of the feudal period, and has one of the largest and finest bull-rings in Spain. Pop. 14,900.

**CA' CERES, NUE'VA**, a t. of the Philippines, in the province of South Camarines, on the island of Luzon. It is situated on the river Naga, or Santa Cruz. Pop. 9800.

**CACERES**, ANDRES AVELINO, Peruvian statesman and soldier, born at Ayacucho in 1838. He fought in the Chilean war (1879-1883), in which he was raised to the rank of general. After the capture of Lima he became vice-president in the provisional government, and later, when the president, Calderon, fell into the hands of the Chileans, Caceres became the head of the government. He refused to acknowledge the supremacy of the Chileans and held out against them for some time. In 1884 in trying to dislodge Iglesias, whom the Chileans had set up as president, he was repulsed before Lima, but having gathered a larger force he entered the city in the following year, and induced the president to refer the presidential question to a popular election. The result was favorable to Caceres, who was chosen president and inaugurated in June, 1886. In 1890 he was succeeded by Bermudez, and went soon afterward as Peruvian minister to Great Britain. In 1894 he was re-elected president.

**CACHEAR**, NORTH, and **CACHAR PLAINS**, districts in the chief commissionership of Assam, British India, having an area of 1728 and 2472 square miles, respectively.

**CACHE** (Fr. a lurking-hole), the name given by parties of travelers in the great western prairies of the United States to places for concealing provisions and other articles. Designing to return on their tracks after crossing the Rocky mountains, they disburden themselves of what articles can be spared, and, to conceal them from the Indians, construct places of deposit in the wilderness. The making of a C. is a matter of much labor and ingenuity. A hole is dug to a depth of perhaps 6 or 8 ft. and several feet broad, and then the articles being interred, the surface is replaced with the utmost possible care. The excavated earth is also carefully removed, so as to leave no trace whatever of the excavation. The situation of the C., however, is known to the party by some landmark, and returning months afterwards, they probably find its contents undisturbed. If containing provisions, the cache needs to be made to resist the depredations of animals, hence it is often covered with rocks.

**CACHEE**, a co. in n.e. Utah, on the Idaho frontier, and the Union Pacific railroad, watered by Bear river; 1090 sq. m.; pop. '90, 15,509. Productions agricultural. Co. seat, Logan.

**CACHEO**, or **CACHEU**, a t. in Senegambia, w. Africa, in the land of the Papels, a few miles from the mouth of San Domingo or Cacha river. It is a Portuguese fortified post, and has trade in ivory and gold dust.

**CACHET**, **LETTRES DE**. See **LETTRES DE CACHET**.

**CACHEXIA**, a name applied by physicians sometimes to a group of diseases, and sometimes to the constitutional state accompanying a particular disease—e.g., cancerous C., gouty C., mercurial cachexia. The word is derived from the Greek *kakos*, bad, and *haxis*, a habit, and signifies simply a *bad habit of body*, without reference to the cause of illness. From Cullen's having in modern times given extensive circulation to the word, as indicating a large group of chronic diseases, in most of which there are complicated changes in the blood and in the solid textures, C. has come to be chiefly employed with reference to diseases in which the general nutrition of the body is at fault, and in which the local disorders are supposed to be the result of a constitutional cause. Thus, cancerous C. indicates the peculiar impoverished state of the blood and general debility which are associated with the deposits of cancer in various parts of the body; gouty C., the state of the general system in gout, as opposed to the mere local attack of gout in the foot, etc. The cachexiæ differ from the fevers in being much slower in development, and, for the most part, in having no natural termination at a fixed period. See **CRISIS**.

**CACHICAMA**, or **TATOU-FEBA**, *Dasypus novem-cinctus*, an armadillo in tropical America, covered with horny plates. It is about 1½ ft. long, harmless, and easily tamed. Its food is ants and other insects.

**CACHOEIRA**, or **CAXOEIRA**, a t. in Brazil, in the province of Bahia, and 57 m. n.w. of the city of Bahia. Its trade is in tobacco, coffee, and sugar. Population with that of São Felix is estimated at 20,000.

**CACHOLONG**, a beautiful mineral, regarded as a variety of opal (q.v.). It is sometimes called pearl opal, or mother-of-pearl opal. It is generally of a milk-white color, rarely with a yellowish or reddish tinge, opaque and dull or pearly and shining, and has a flat conchoidal fracture. Among the localities in which C. is found are the Giants' Causeway and the Farøe islands.

**CACHOLOT**, **CACHALOT**, **SPERMACETI WHALE**, or **SPERM WHALE**, *Physeter macrocephalus* or *catodon macrocephalus*, one of the largest of the *cetacea* (q.v.), very peculiar in form and appearance, much sought after not only on account of the oil, but still more on account of the spermaceti (q.v.) which it yields. Ambergris (q.v.) is also obtained from it. The C. belongs to the family of *cetacea* called *physeterida*, or *catodontida*, of which some naturalists still think that there is only one well-ascertained species. There appears, however, to be pretty good reason for thinking that at least two species exist, both of which are occasional visitants of the British shores—the common C., having no dorsal fin, and the high-finned C. (*physeter turio*) having a very high dorsal fin. The common C. has a very wide geographical range. It may almost be said to inhabit all seas, although it is most abundant in those of the southern hemisphere. It is not of frequent occurrence on the European shores, although it sometimes enters the Mediterranean, and is occasionally stranded on the coasts of Britain. An individual, 54 ft. long and 80 in circumference, ran ashore on Cramond island, in the firth of Forth, in 1769, and was very particularly described in the *Philosophical Transactions* by Mr. Robertson of Edinburgh. Twelve were caught at Walderwich, on the English coast, in 1788. The C. sometimes reaches the length of 70 or 80 feet. The head is enormously large, forming about one half of the entire bulk of the animal, and occupying more than one third of the entire length. From the head, the body tapers to the tail, and at last rather rapidly. The general color is very dark gray, nearly black on the upper parts, lighter beneath. Old males, or, in the language of the South Sea whalers, old bull-whales, usually have a large gray spot on the front of the head. The muzzle is very obtuse, almost as if suddenly cut off in front, the breadth of it almost equaling the thickness of the body. In a protuberance on the upper part of it, is the blow-hole, which is single, situated a little on the left side, and in form not unlike the letter S elongated. The mouth is very large and wide; and the throat, unlike that of the Greenland whale, is very wide, sufficiently so to admit the body of a man. The upper jaw projects some feet beyond the lower, and is destitute both of teeth and whalebone; the lower jaw has from 20 to 25 teeth on each side, according to the age of the animal. The teeth are conical and slightly recurved, projecting about 2 in. from the gum. The lower jaw is extremely narrow, the two branches being in contact throughout the greater part of its length: it fits into a groove in the upper, in which are cavities for the teeth. The eyes are small, and placed far back in the head, above the angles of the mouth; the left eye is said to be smaller than the right. Just above the eyes, the dorsal line rises considerably; the dorsal fin is also represented by a protuberance about half-way between the neck and the tail; and these parts are seen above water in the ordinary swimming of the animal, which is at the rate of from 3 to 7 m. an hour, and just under the surface of the water, although when alarmed it swims with greater velocity, strik-

ing the water upward and downward with its tail with great force. The pectoral fin are small, and seem scarcely if at all to aid in progression, which is accomplished by the large and powerful tail-fin. The tail-fin is very broad, and is divided into two lobes, called by South Sea whalers *the flukes*.

The enormous head of the C. is in great part occupied by a cavity in front of, above the skull, called by whalers *the case*, which is a receptacle for spermaceti (q.v.). This substance being light, it is not wonderful that the animal in swimming raises its head above the surface of the water, which it also often does even when at rest, "like a black rock in the ocean." The *case* frequently holds as much as ten large barrels of spermaceti. It is not formed of bone, but of a strong tendinous integument, and divided into compartments communicating with each other. The substance which contains it is in a semi-fluid state, but hardens on cooling: it consists of spermaceti and oil; the oil is separated by draining and squeezing, and the spermaceti further purified till, instead of being a yellow unctuous mass, in which state it is brought home by the whalers, it assumes a beautiful pearly white, flaky, almost crystalline appearance. When the spermaceti whale is killed, and towed alongside the whaling-ship, the *case* is emptied of its valuable contents through a hole made in front of the muzzle, and by means of a bucket attached to a pole. The spermaceti was at one time imagined to be the brain of the whale; what purpose it serves in the animal economy, is not well known, except that already alluded to of giving buoyancy to the forepart of the huge body; and perhaps this is its chief use, respiration even more than progression depending on it; it is distinct enough from the brain, which is comparatively very small, and is indeed as well as the skull which contains it, small in proportion to the whole bulk of the creature. Cavities filled with spermaceti are distributed over the body, and ramify through the external fat or blubber, although the principal mass is in the blubber of the C. is not nearly equal in thickness to that of the Greenland being only about 14 in. thick on the breast of a large whale, and from 8 to 11 in. on other parts of the body. It is called by whalers the *blanket*, is removed from the captured whale in great strips, and is heated in large pots, the skin of the whale serving for fuel, when the oil known as sperm oil (q.v.) flows from it. The thick elastic mass, which occupies the forepart of the head, immediately under the eye, yields also a considerable quantity of sperm oil. See WHALE.

**CACHUCHA**, an Andalusian dance of much grace. Its origin is unknown, but it is written in 8-4 time, and resembles the *Bolero* (q.v.). The cachucha is usually danced with castanets. It was introduced on the stage by Fanny Elssler in the *diabla boiteuse*.

**CACIQUE'**, or **CAZIQUE'**, the designation given to the chiefs of Indian tribes relating to the central and southern parts of America. The word was derived from Spaniards from the language of the former inhabitants of St. Domingo.

**CACODEMON**. See DEMON.

**CA'ODYLE**, or **KA'KODYLE**, is an organic substance containing carbon and arsenic, C<sub>2</sub>H<sub>2</sub>As. It has been proposed to employ the oxide of C. as a deadly agent in war. This compound, otherwise known as *Cadet's fume*, or *alkarsine*, has the remarkable property of taking fire spontaneously when exposed to air, and evolving abundant fumes of arsenic.

**CACOGRAPHY** (Gk. *kakos*, "bad;" *grapho*, "writing"), bad writing, opposed to *calligraphy*; incorrect spelling, or a bad system of spelling the current English. In this use the term is opposed to *orthography*.

**CACON'GO**, or **MALLEM'BA**, an independent state of s. Guinea, A. along the s. Atlantic ocean, in lat. 5° s., and stretching s.e. as far as the limits interiorly are not well defined. The country is generally flat, and the principal towns are Kinguele, and Cacongo and Mallemba on the coast, once a great mart for slaves.

**CACOPHONY** (Gk. *kakos*, "bad," *phōne*, "sound"), as a term of rhetoric uncouth or disagreeable sound of words, caused by the concurrence of dissimilar syllables. As a musical term, it signifies a combination of discordant sounds opposed to harmony. In medicine also the word has been in use to denote a discordant state of the voice.

**CAC'TEE**, or **CAC'TACEÆ**, a natural order of exogenous plants, consisting of woody or herbaceous plants of very singular appearance. Linnæus included all the plants of the genus *cactus*, which is now divided into a number of genera; the name is still continuing in popular use, common to the whole order. The number is not known, but the real number is probably much greater. The C. are natives of America, and their extraordinary forms constitute a remarkable part of its warmer regions. All of them have fleshy stems, some branched, often very soft and juicy; but in many, at least when young, a distinguished woody axis, composed of annual rings, and covered with bark, so that the thick fleshy part may be regarded only as a layer between the bark and the pith; the *pereskia* alone have true leaves, which are fleshy and rudimentary leaves, which soon fall off; but, instead of leaves have clusters of hairs or prickles, where buds are formed in their s



very numerous, even in the species which in ordinary circumstances most rarely develop branches. The multiplicity of curious forms exceeds imagination; in many species (*melocactida*, or melon thistles), the stem swells out into a globe; in others (*torch thistles*), it rises up as a column with many angles; in others (*opuntia*, Indian figs, or prickly pears), it divides in leaf-like articulations; in some (*pereskia*) it assumes a tree-like form, in which the thick stem bears a head of branches, and reaches a considerable height, sometimes even 30 or 40 feet. Those which have angular, ribbed, and channeled, or flat and two-edged stems, show a tendency to the cylindrical form as the stem advances in age. Some species have long creeping or trailing stems. The whole organization of the C. adapts them for the endurance of long droughts; they vegetate vigorously during a part of the year, and then rest; the very absence of leaves concurring with the absence of pores or *stomata* in their tough skin to enable them to resist the action of a dry atmosphere and powerful sunshine, and to occupy arid soils and bare rocks, on which they are very generally found, often covering large tracts. Some of them grow rapidly on old lavas, and disintegrate them by their penetrating roots, thus preparing a soil for other plants; and the prickly pear is often planted in Sicily by the mere insertion of a branch or joint of it in a fissure of lava. Many species occur as *epiphytes* (q.v.) on the trees of American forests. Some also grow on high mountains, a few even reaching almost to the border of the snow. The plants of this order are a great boon to the regions in which they chiefly abound, which are, at least during great part of the year, very destitute of water; their stems containing a store of insipid and wholesome juice, of which both men and cattle avail themselves.—Some species, as the prickly pear (q.v.), produce a pleasant fruit.—The fruit of *opuntia tuna* affords a valuable pigment of the richest carmine color.

The flowers of the C. are in general very short-lived; those of some night-flowering species, as of *cereus grandiflorus*, well known in our hothouses, endure only for part of a single night. In the greater number, they are large and splendidly colored, in some they are very fragrant. The order is regarded as botanically allied to *mesembryaceæ* (q.v.) and to *grossulariaceæ* (q.v., gooseberry, currant, etc.).

The cultivation of the C. in green houses and hothouses has been much in fashion for more than 30 years. The gardener must imitate the natural conditions of their growth, by giving water freely during a few months, and withholding it almost entirely during the rest of the year. Most of them are easily propagated by branches, taken off, and allowed to dry a little before being planted. The *melocactida*, which do not readily produce branches, are made to do so by cutting off or burning out the central bud, that the means of propagating them may be obtained.

**CACTUS.** See **CACTEÆ.**

**CAJUS**, in legend, a gigantic son of Vulcan, who dwelt in a cave on mount Aventine and continually vomited fire and smoke. He stole cattle from the people and drew them backward into his cave, so that their tracks would not point to his abode. He was slain by Hercules for stealing the cattle of Geryon.

**CADAM'BA**, or **KUDUMBA**, the wood of several species of *nauclea*, a genus of trees of the natural order *cinchonaceæ*, natives of the East Indies, having flowers with a funnel-shaped corolla. *N. cadamba* is a noble tree, with orange-colored fragrant flowers, collected in heads about the size of a small apple. The leaves are from 6 to 10 in. long. The wood is yellow, soft, and fine-grained. The tree is highly prized for the shade which it affords; the wood is used for various purposes. *N. cordifolia* is a large tree, plentiful in mountainous districts of Hindustan; the wood yellow, close-grained, and used for flooring-planks, packing-boxes, and many other purposes, as is also that of *N. parviflora*. All kinds of C. wood are, however, liable to be injured by moisture, and can only be used where they are to be kept dry.

**CADA MOSTO**, **LUIGI DA**, 1432–80; a Venetian navigator, who, with others, in 1482, explored the w. coast of Africa as far south as the river Gambia. He wrote an account of his voyages in the *Book of the First Voyage over the Ocean to the Land of Negroes in Lower Ethiopia*.

**CADASTRAL SURVEY** is one which represents objects in their true relative positions and dimensions, as they exist on the face of the country, differing thus from a topographical survey, which, for distinctness, enlarges certain objects, as the dimensions of houses, width of roads, streams, etc. The usual scale of a map of C. S. is about 2 ft. to a mile.

**CAD'DICE**, or **CAD'DICE-FLY** (*phryganea*), a Linnæan genus of insects of the order *neuroptera*, a family in subsequent entomological systems, and constituted by Mr. Kirby into a distinct order, *trichoptera* (Gr. hairy-winged). The caddice-flies certainly differ in important particulars from the other neuropterous insects, and exhibit points of resemblance to the *lepidoptera*. They have no mandibles, and the maxillæ and lower lip are membranous and united; the head is small, with prominent eyes, and two additional small simple eyes situated on the forehead; the antennæ are long and bristle-like, composed of very numerous indistinct joints. Both wings and body are generally very hairy, and the wings, when at rest, are raised, and meet above the back like those of butterflies, from which, however, they differ very much in form, being much more

elongate: the legs are long. Caddice-flies are extremely active, particularly in the evening and at night, when the smaller species often fly in great numbers above streams and ponds. These insects are most interesting, however, on account of their larvæ, of which the larger kinds are the well-known *caddice-worms*, or *cad-bait* of anglers. They are of a long, almost cylindrical form, the head and first three segments hard, the remainder—the abdominal segments—soft. To the thoracic segments are attached the feet, six in number, as in the perfect insect. The larva lives always in water, feeding on aquatic vegetables. It spins by its mouth silken threads, by means of which, together with a viscid substance, it attaches together—and often in a very symmetrical manner, and with interesting peculiarities which differ in the different species—small hard substances, such as small stones, bits of stick, or small shells, even although they happen to contain living inmates, and thus constructs a case for itself, in which its soft body is protected, and from which only the head and hard thoracic segments are voluntarily protruded. When it changes into the pupa state, in which it differs little from the perfect insect, except in the imperfectly developed wings, it fixes its case to some solid substance beneath the water, and closes the two extremities with a kind of grating, which admits the free passage of water, necessary for respiration. Before assuming the perfect form, the pupa of the larger species breaks out of its case by means of a pair of hooks on the forepart of the head, and swims actively by means of the hind legs, or crawls by the other two pair. Many of the smaller species bring their pupa case to the surface of the water, and there take wing from it as from a boat. The species of caddice-fly are very numerous, and they are said to be more so in the n. than in the s. of Europe. Many American species have been described.—The angler looks for cad-bait about the edges of streams and under stones, or on the stalks of water-cresses, and other aquatic plants. As a bait for angling, the caddice is almost as deadly as the May-fly, and more so, in clear running streams, than the ordinary worm; the usual-sized bait-hook is used, upon which two of the baits are fixed, the angler proceeding exactly as in ordinary worm-fishing.

**CADDO**, a parish in n.w. Louisiana, bordering on Arkansas and Texas; 825 sq.m.; pop. '90, 31,555, includ. colored. Productions, corn, cotton, sweet potatoes, etc. The Texas Pacific railroad passes through the parish. Principal town, Shreveport.

**CADDOES**, or **CADODAGUOS**, Indians in or near Texas on the upper Red river and lake Caddo. There are but a few hundreds left of a once large tribe.

**CADE, JACK**, a historical character, leader of an insurrection in Kent, England, June, 1450. Little is known of his personal history, further than that he was an Irishman, and an illegitimate relation of the Duke of York, and hence called himself Mortimer. With 15,000 or 20,000 armed men of Kent, C. marched on London, and encamped at Blackheath, whence he kept up a correspondence with the citizens, many of whom were favorable to his enterprise. The court sent to inquire why the good men of Kent had left their homes; C., in a paper entitled "The Complaint of the Commons of Kent," replied that the people were robbed of their goods for the king's use; that mean and corrupt persons, who plundered and oppressed the commons, filled the high offices at court; that it was "noised that the king's lands in France had been aliened;" that misgovernment had banished justice and prosperity from the land; and that the men of Kent were especially ill-treated and overtaxed, and that the free election of knights of their shire had been hindered. In another paper, called "The Requests by the Captain of the Great Assembly in Kent," C. demanded that the king should resume the grants of the crown, which he complained the creatures about the royal person fattened on, the king thus being compelled to live on taxation; that the false progeny of the duke of Suffolk should be dismissed; and that the duke of York and others should be restored to favor, and a number of persons punished. The court sent its answer in the form of an army, before which C. retreated to Sevenoaks, where he awaited the attack of a detachment, which he defeated. The royal army now objected to fight against their countrymen; the court made some concessions, and C. entered London on the 8d July. For two days, he maintained the strictest order; but he forced the mayor and judges to pass judgment upon lord Say, one of the king's hated favorites, whose head C.'s men immediately cut off in Cheapside. On the third day, some houses were plundered, the leader himself, it is said, setting the example. C., who at night lodged his army in the borough, got news that the citizens intended to prevent his entrance into the city on the morrow, and in the night he made an attack on the bridge, but was defeated. A promise of pardon now sowed dissension among his followers, who dispersed, and a price was set upon C.'s head. He attempted to reach the Sussex coast, but was followed by an esquire, named Alexander Iden, who fought and killed him, July 11. His head was stuck upon London Bridge, as a terror to traitors.

**CADELLE**, *trogosita mauritanica* or *caraboides*, an insect sometimes found in granaries in Britain, but seemingly imported from more southerly countries, where, as in France, its larvæ often commit great ravages among stored corn. They also live on bread, almonds, and even rotten wood. When full grown, they are about  $\frac{1}{4}$  of an in. long, flattened, fleshy, rough with scattered hairs, whitish, tapering towards the head; which is black, horny, and furnished with two curved jaws. The perfect insect is a glossy beetle of a deep chestnut color, marked with dotted lines. It belongs to the

family of *xylophagi*, of the order of *coleoptera* (q.v.), section *tetramera*. The name *C.* is French.

**CADENCE**, a term in music, corresponding to the full stop in language. At the end of a movement, or work, a succession of chords generally follows one after another to bring it to a conclusion. These usually produce a feeling of expectation, or suspense, until the chord of the tonic is given to satisfy the ear. Some authorities define a number of cadences, but they are commonly divided into three kinds: the Perfect, the Imperfect, and the Interrupted cadences. In the first, the progress is usually made from the dominant to the tonic, since the dominant chord contains the notes which are most remote in their relation to the tonic. The Perfect Cadence in ancient church music was divided into two forms—the Authentic and the Plagal—which are sometimes used in modern music to express a sentimental or romantic idea. The Imperfect Cadence is the reverse of the Perfect, in which the tonic chord precedes the dominant, leaving the ear unsatisfied, although the effect of a stop is produced. The Imperfect Cadence is sometimes aptly termed the half close. It corresponds in a way to the colon, or semicolon. In the Interrupted Cadence the chord of the dominant, instead of proceeding directly to the tonic, is followed by the chord of the sixth note in the key—the submediant; but this can only be distinguished from the Imperfect by referring to the context; for, instead of bringing the musical idea to a definite stop, it keeps postponing the termination or evading it altogether. There are many subordinate cadences in the course of a movement, especially in modern music, which has a tendency to avoid full cadences, and to vary them as much as possible when the nature of the work demands their use.

**CADENCY** (from Lat. *cado*, to fall or decline). The marks by which the shields of the younger members of families are distinguished from those of the elder, and from each other, is an extensive, and, in so far as that term can be applied to heraldry at all, an important branch of the science. No distinction is usually made by writers on heraldry, and probably the practice of heralds in general scarcely admits of any being made, between *marks of C.*, *differences*, *distinctions*, or even *brisures*, though the last term is pretty constantly and quite appropriately used to include not only differences in general, but also abatements (q.v.) or bearings by which the arms of the family are broken or diminished. See **BASTARD BAR**. But there is a manifest convenience in the practice which is usually followed in Scotland, of appropriating the label, the crescent, the mullet, and the rest of the series of marks, commonly known as marks of *C.*, to the purpose of distinguishing the sons from the father, and from each other, during the father's life-time.

**CADENZA**, in music, an ornamental succession of notes introduced at pleasure by the performer at the finishing of a phrase.

**CADEB IDRIS** (chair of Idris, a reputed giant), a picturesque mountain in Merionethshire, Wales, 5 m. s.s.w. of Dolgelly. It consists of an immense ridge of broken precipices, 10 m. long, and 1 to 8 m. broad; the highest peak reaching an elevation of 2914 feet. It is composed of basalt, porphyry, and other trap rocks.

**CADET, MILITARY** (Fr. *cadet*, younger, junior in service—allied in derivation and meaning to cadency (q.v.) in heraldry), is a term applied in a general sense to a junior member of a noble family as distinguished from the eldest; and in France, any officer junior to another is a cadet in respect to him. In a strict military sense, however, a cadet is a youth studying for the public service. In the United States the military cadets are the students at the West Point Military academy, who pursue a four years' course of study preparatory to receiving their commissions as officers in the army. They are appointed, one from each congressional district, by the secretary of war, upon the recommendation of the congressmen of the respective districts, who generally make the selection by competitive examinations for determining the relative merits of applicants; one from each territory and from the District of Columbia; and ten at large by the President. In England, military cadetship has presented two aspects, according as it is related to the East India company's or to the royal service. The former underwent various modifications by the introduction of competition in the appointments, and by the transference of the company's power to the crown, and ceased in 1861, when the accession of fresh officers to the local Indian armies was stopped. The second aspect of military cadetship, that of the royal or queen's cadets, will be noticed under the titles, **SANDHURST COLLEGE**, **STAFF COLLEGE**, and **MILITARY ACADEMY, ROYAL**. For a further description of United States Cadets, see **WEST POINT** and **UNITED STATES MILITARY ACADEMY**.

**CADET, NAVAL**, a youth pursuing a course of study at some public institution provided for the purpose, with the end of fitting himself for entering the navy; in the United States a student at the Naval Academy at Annapolis, appointed in the same manner as a military cadet (q.v.), and required to remain under instruction for a period of six years, four of which are spent at the academy, and two at sea. Candidates for admission must be between the ages of fourteen and eighteen, in sound physical condition and with evidence of good moral standing, and must pass satisfactory examinations in algebra, arithmetic, English grammar, United States history, geography, writing and spelling. In England the cadets enter the service at 12 to 18½ years of age. Every captain, on being appointed to a ship in commission, is allowed to nominate one cadet;

every flag officer, two, on hoisting his flag; each member of the board of admiralty, four; the two secretaries, two each; and all the rest are nominated by the first lord of the admiralty. After passing an examination at the Royal Navy college, at Greenwich, and undergoing a successful probation for two years on board the training ship *Britannia*, they are assigned to sea-going ships, where, if they bring a first-class certificate from the *Britannia*, they become midshipmen at once; otherwise, according to the progress they make. See ANNAPOLIS, UNITED STATES NAVAL ACADEMY.

**CADET'S FUMING LIQUOR.** See CACODYLE.

**CADI**, an Arabic word signifying a judge or person learned in the law, the title of an inferior judge amongst the Mohammedan nations, who, like the Mollah (q.v.), or superior judge, must be chosen from the higher ranks of the priesthood, as all law is founded upon the Koran.

**CADILLAC**, city and co. seat of Wexford co., Mich.; on the Ann Arbor and the Grand Rapids and Indiana railroads; 96 miles n. of Grand Rapids. It is in a noted hard-wood timber belt, between Big and Little Clam lakes, and has electric lights, high school with library, several machinery factories, large lumber interests, and churches and weekly newspapers. Pop. '90, 4461.

**CADILLAC**, ANTOINE DE LA MOTHE, d. 1719; a French pioneer and officer in America, who came to Nova Scotia in 1691; commanded at Michilimackinac, 1691-97, and in 1701 founded Detroit. He was governor of Louisiana, 1712-17, where he had much trouble with the Indians.

**CADIZ**, a province in s. Spain, in the ancient division of Andalusia; bounded n. by Seville, e. by the Mediterranean, s. by the straits of Gibraltar, and w. by the Guadalquivir; 2909 sq. m.; pop. '87, 429,782. It is a mountainous region, traversed by the Sierra Nevada, and but partially cultivated. The wines of the province are especially fine. The western part is traversed by the Seville and Cadiz railroad.

**CADIZ** (ancient *Gades*), an important commercial city of Spain, capital of the modern province of the same name, which forms a part of the great division of Andalusia; is situated at the extremity of the long narrow isthmus of the Isle of Leon, in lat. 36° 32' n., and long. 6° 17' west. The Atlantic ocean washes its western and part of its southern side, and on the n. and n.e. it is inclosed by the bay of Cadiz, a deep inlet of the Atlantic, forming an outer and an inner bay. Connected by only a narrow strip of ground (in some places not above 200 yds. across) with the mainland, C. is admirably situated for defense; but though it has several sea and land fortifications, these are by no means considered impregnable. The town, which is surrounded by walls, forms nearly a square, each side being about a mile and a half in length. The houses being built of white stone, the city presents a remarkably bright and clean appearance from the sea. The streets are well paved and lighted, regular, but narrow, and there are some pleasant public walks, the most frequented of which is the Alameda. It has few public buildings of note; its two cathedrals are, on the whole, but poor specimens of ecclesiastical architecture, and its pictures, with the exception of one or two excellent pieces by Murillo, are of little value. C. declined greatly as a commercial city after the emancipation of the Spanish colonies in South America; but owing partly to the extension of the railway system in Spain, and partly to the establishment of some new lines of steamers, the trade has revived considerably. The exports consist of wine, olive oil, fruits, salt, and metals. The manufactures are jewelry, tobacco, gloves, cotton and woolen cloth, soap, hats, leather, etc. Pop. '87, 62,531.

C. is one of the most ancient towns in Europe, having been built by the Phenicians, under the name of Gaddir, 847 years before the foundation of Rome, or about 1100 B.C. It afterwards passed into the hands of the Carthaginians, from whom it was captured by the Romans, who named it Gades, and under them it soon became a city of vast wealth and importance. Occupied afterwards by the Goths and Moors, it was taken by the Spaniards in 1262. In 1587, Drake destroyed the Spanish fleet in the bay; nine years later, it was pillaged and burned by lord Essex; and in 1625 and 1702, it was unsuccessfully attacked by other English forces. After the revolution of 1808, C. became the headquarters of the insurrectionary junta, by whose orders it was separated from the mainland. The French, in Feb. 1810, commenced a blockade, which they vigorously persevered in, capturing several of the forts, until Aug. 25, 1812, when the victories of the duke of Wellington forced them to abandon it. The city was besieged and taken by the French in 1823, and held by them until 1828. In the Spanish revolution of 1868, C. played a distinguished part.

**CADNIA** is the term applied to the crust formed in zinc furnaces, and which contains from 10 to 20 per cent of cadmium.

**CADMIUM** is a metal which occurs in zinc ores, and, being more volatile than zinc, rises in vapor, and distills over with the first portions of the metal. See ZINC. C. is represented by the symbol Cd, has the atomic weight 56—new system, 112—and the specific gravity 8.6. It is a white metal, somewhat resembling tin; is malleable and ductile; fuses at 599° F. (315° C.), and boils about 1580° F. (860° C.). It is rarely prepared pure, and is not employed in the arts as a metal, though one or more of its salts have been serviceable in medicine and photography. The sulphide of C., CdS, occurs naturally as the mineral *greenockite*, and when prepared artificially, is of a bright yellow color. It is known as cadmium yellow, and is of great value to the artist. A great variety of

tints is produced by mixing it with white-lead. Much of what is sold as Naples yellow (q.v.) is thus prepared; but the genuine Naples yellow has a greenish tint, which renders it easily distinguishable from the imitation. Cadmium yellow, however, has many valuable qualities, which are causing it rapidly to supersede Naples yellow.

**CADMUS** (according to Apollodorus and others) was the son of Agenor and Telephassa, and the brother of Europa. When the latter was carried off by Zeus, he and his brothers, as also their mother, were sent in quest of her, with injunctions from Agenor not to return without her. Their search was vain, and the oracle at Delphi told C. to relinquish it, and to follow a cow of a certain kind which he should meet, and build a city where it should lie down. He found the cow in Phocis, followed her to Boeotia, and built there the city of Thebes, about 1550 B.C. The myth of C., however, like other early Greek myths, abounds in contradictions, and it is wholly impossible to disentangle the historical facts from the meshes of fable in which they are imprisoned. To him is ascribed the introduction into Greece of an alphabet of 16 letters, derived from Egypt or Phenicia, and the discovery of brass, or introduction of its use.

**CADOU DAL**, GEORGE, a distinguished leader in the Chouan or royalist war in Brittany, was b. near Auray, in lower Brittany, where his father was a miller, in 1771. He was among the first to take up arms against the republic, and soon acquired great influence over the peasants. Captured in 1794, he was sent as a prisoner to Brest, from which he soon made his escape, imprisonment having only increased his loyal ardor. Annoyed at the dissensions between the Vendean generals and the emigrant officers, and the disasters consequent thereon, C. organized an army in which no noble was permitted to command, and which Hoche, with all his great military talents, was unable to subdue or disperse. In 1799, C. was the soul of the conspiracy to overthrow the first consul, and place a Bourbon on the throne; but the events of the 18th Brumaire disarranged the plans of the conspirators. Bonaparte recognized C.'s energy and force of character, and offered to make him a lieutenant in his army, which offer C. refused, as well as another of a pension of 100,000 francs, if he would only consent to remain quiet. Bonaparte attempted to arrest him, but he fled to England, where, in 1802, he conspired with Pichegru for the overthrow of the first consul. With this design he went to Paris, but was arrested, condemned, and executed June 25, 1804. C. was a man of stern honesty and indomitable resolution. "His mind was cast in the true mold; in my hands he would have done great things," was Napoleon's estimate of him.

**CADRE**. (French, frame, outline, from Italian *quadro*.) The nominal establishment of officers of a regiment; the regiment on a peace footing; the skeleton organization, to be filled out in war by drafts from the reserve.

**CADUCEUS**, the winged staff of Mercury, or Hermes, as he was called by the Greeks, which was supposed to give the god power to fly. The C. in the actual world was the staff or mace carried by heralds and ambassadors, from which circumstance, no doubt, it came to form one of the attributes of the messenger of the gods. Originally, it was simply an olive-branch, the stems of which were afterwards formed into snakes, in accordance with several poetical tales invented by the mythologists. One of these was to the effect that Mercury, having found two snakes fighting, divided them with his rod, and that thus they came to be used as an emblem of peace. Many miraculous virtues were ascribed to the caduceus. On the coinage of antiquity, the C. is often given to Mars, who holds it in the left hand, a spear being in his right, to show how peace and war alternate. It is also seen in the hands of Hercules, Bacchus, Ceres, Venus, etc. Amongst the moderns, the C. is used as an emblem of commerce, over which Mercury was the presiding divinity.

**CADWALADER**, GEORGE, 1804-79; b. Penn.; bred to the law; served as brig.-gen. in the Mexican war and maj.-gen. of volunteers in the civil war.

**CADWALADER**, OR **CADWALLADER**, JOHN, 1742-86; b. Penn.; a member of the Pennsylvania convention of 1775, and brig.-gen. in the revolutionary war, participating in the engagements at Brandywine, Germantown, Monmouth, and Trenton. After peace he was a member of the Maryland assembly.

**CÆCILIA** (Lat. *cæcus*, blind), a genus of reptiles, formerly placed among serpents, on account of their form, although, in their anatomical structure, peculiarities were observed alluding them to batrachians, with which they are now ranked, the important fact having been ascertained of their breathing by gills when young, and undergoing a metamorphosis. The body is almost cylindrical or worm-like, the head small, the eyes very small, and nearly hidden by the skin; in some species, indeed, imperfect or wanting, upon which account the name C. was given to them, and an attempt has been made to transfer to them the English name blindworm, commonly given to the *anguis fragilis*. The skin is smooth, viscous, and annularly wrinkled, appearing naked, although, upon dissection, minute scales are found disposed between its wrinkles, at least in some species. The vertebrae are articulated as in fishes and in some of the other lower batrachians, not as in serpents, and the skull is united to the first vertebra by two tubercles. The ribs are imperfectly developed, and much too short to encircle the trunk.—The original genus C. has been subdivided, now forming a family, *cæciliada*. The species are inhabitants of warm climates, and of marshy or moist places.

**CÆCILIUS STATIUS**, d. 168 B.C.; a Roman comic poet and dramatist, of whose works few fragments remain. The people ranked him with Plautus and Terence.

**CÆCUM** (Lat. *cæcus*, blind), a blind sac; that is, a sac or bag having only one opening, connected with the intestine of an animal. In man there is only one C., very small, and apparently not performing any important function, situated at the extremity of the small intestine, where it terminates in the large intestine or colon. In many of the mammalia, however, and particularly in most of those which are herbivorous, it is comparatively large, and is found to secrete an acid fluid resembling the gastric juice. It therefore appears that, where the nature of the assimilatory process is such as to require the detention of the food for a considerable time, this provision is made for it, in order that digestion may be more completely accomplished. The C. is entirely wanting in some quadrupeds, as in bats, and the bear and weasel families. Birds have two cæca, which are generally long and capacious in those that are omnivorous or granivorous, and the position of which is the only circumstance that marks the division of the intestine into two parts, the small and the large intestine, or the *ileum* and the *colon*. In reptiles, a C. is of very rare occurrence. Fishes have none in the position occupied by those of quadrupeds and birds, but many of them have cæca attached to the intestine at its uppermost part, and very generally regarded as appendages of the stomach. The number of these cæca is, however, extremely various; sometimes there are only 2, and sometimes more than 100. The number is different even in very nearly allied species of the same family; thus, there are only 6 in the smelt, but 70 in the salmon; 24 in the herring, and 80 in the shad. In some fishes, as the cod, the cæca consists of large trunks ramified into smaller ones.—The intestinal canal of some of the *infusoria* is furnished throughout its whole length with numerous cæca, no other organ corresponding to a stomach appearing to exist. See VERMIFORM APPENDIX.

**CÆDMON**, the first Anglo-Saxon writer of note who composed in his own language, and of whom there are any remains. The date of his birth is unknown, but his death occurred about 680 A.D. He was originally a cowherd attached to the monastery of Whitby, and, according to Bede, "even more ignorant than the majority of his fellows, so that in the evenings, when the domestics assembled in the hall to recreate themselves with music after the labors of the day, C. was frequently obliged to retire in order to hide his shame when the harp was moved towards him." One night, however, as he was sleeping in the stable loft, a stranger appeared to him, and commanded him to sing. C. declared his ignorance, but the stranger would take no refusal, and imposed on the poor cowherd the sublime task of hymning the glories of creation. Suddenly a poetic inspiration seized him, and he began to pour forth verses. When he awoke from his dream the words remained fast-rooted in his memory, and were recited by him to others with new confidence. The abbess Hilda, and the learned men who were with her in the monastery, immediately declared that he had received the gift of song from heaven. He was now educated, became a monk, and spent the rest of his life in composing poems on the Bible histories and on miscellaneous religious subjects, many of which have been preserved, and are altogether in bulk nearly equal to the half of *Paradise Lost*, to parts of which some of them bear a striking resemblance. Satan's speech in hell is characterized by a simple yet solemn greatness of imagination, which may possibly have influenced at some period of his life the more magnificent genius of Milton.

The study of Cædmon had been virtually neglected for more than a century, when in 1830, the Danish scholar Grunot called the attention of English scholars to it. Editions of the *Paraphrase* of Cædmon have been published by Thorpe (trans. Lond., 1832); Bouterwek (Elberfeld and Güttersloh, 1851 and 1854); Grein in his *Bibliothek der angelsächsischen Poesie* (Gött., 1857-64). For the part relating to Exodus and Daniel. See vol. ii. of Harrison and Sharp's *Library of Anglo-Saxon Poetry* (Boston, 2d ed., 1886). See also Bernhard ten Brink's *History of English Literature* (vol. i., 1877); and Morley's *English Writers* (vol. ii., 1888).

**CÆLATU'RA**. See CHASING.

**CÆLIUS AURELIANUS**, a physician of Numidia in the latter days of the Roman empire, and author of a valuable medical work. He divided disease into two great classes, acute and chronic, devoting his work of ten books to their elucidation.

**CÆLIUS MONS**, one of the seven hills of Rome. See **ROME**.

**CÆEN**, the chief t. in the department of Calvados, France—formerly the capital of lower Normandy—is situated on the left bank of the Orne, about 9 m. from its mouth, 122 m. w.n.w. of Paris. C. is built in the middle of a fertile plain; its streets are wide and clean, it has several fine squares, and many noble specimens of ancient Norman architecture. Among the best examples are the churches of St. Etienne, founded by William the Conqueror, and which contained his monument, erected by William Rufus, and destroyed by the Huguenots in 1562; La Trinité, called also *Abbaye aux Dames*, founded by Matilda, wife of the Conqueror; St. Nicholas, now a cavalry fodder-store; St. Pierre and St. Jean. The castle, founded by the Conqueror, and finished by Henry I. of England, was partially destroyed in 1793. There are several beautiful promenades in the city, which has manufactures of lace, blonde, crape, cutlery, cotton-yarn; breweries, dye-works, wax-bleaching, and ship-building yards. Its Angora gloves, made from the unwashed, undyed fur of Angora rabbits, which are reared in the district, are celebrated. Quarries in the neighborhood produce an excellent stone, called Cæen stone (q.v.). Trade is facilitated by a maritime canal connecting the port with the sea, and

also by the railway connecting it with the Paris and Rouen line; those to Cherbourg, Tours, and Houlleur, and that to Fiers, opened in 1867, which affords C. communication with Granville. Nothing is known of C. before the 9th century. Pop. '96, 45,380.

**CAEN STONE.** The neighborhood of the t. of Caen, in Normandy, has been celebrated for its stone quarries from a very early period. The excellence of the stone, and the facility of transport by sea, led to C. S. being very extensively used in England in the 15th and 16th centuries. In 1460, the abbot of Westminster obtained a license to import C. S. for the repairs of the monastery. Later, it became a regular article of importation, and in 1582 it is rated at the custom-house at 6s. 8d. the ton. Winchester and Canterbury cathedrals, Henry VII.'s chapel at Westminster, and many country churches, are built of C. S., which is still frequently used in England. The stone is an oolite, resembling Stonesfield slate, but without its slaty structure. The quarries are subterraneous, and the stone is brought up through vertical shafts in blocks 8 or 9 ft. long, and about 2 thick.

**CÆRE.** See CERVETERÆ.

**CÆRLE'ON** (Castle of the Legion), a small but ancient t. in Monmouthshire, on the right bank of the Usk, 2 m. n.e. of Newport. It is the Ica Silurum of the Romans, and is supposed to have been the capital of the Roman province Britannia Secunda, now Wales, and the residence of the famous king Arthur. It was the seat of an ancient archbishopric, which was removed to St. Davids about 519 A.D. An abbey of Cistercian monks existed here before the reformation. C. was an important place in the 12th c., but it was afterwards ruined by the frequent wars between the Welsh and Anglo-Saxons. Many Roman relics have been found here, as aqueducts, baths, pavements, altars, tiles, coins, inscriptions, and statues; many of the smaller antiquities are deposited in a museum in the town; besides half-melted ore and cinders, and the remains of a fortress, with walls 12 ft. thick and 1800 yards long, and of an amphitheater, called king Arthur's round table, 222 by 192 ft. in size. Pop. '91, 1411. The chief occupation is the manufacture of tin-plates.

**CAERMAR'THEN** (Welsh, *Caer Fyrdwyn*, the *Maridunum* of Ptolemy), a seaport t., capital of Caermarthenshire, South Wales, on the right bank of the Towy, 9 m. from Caermarthen bay. It lies in a picturesque situation, but the streets are irregular, steep, and often narrow. The Towy is navigable for vessels of 200 tons up to the town, and salmon and sewin are caught in the river. There are tin and iron works near the town. C. exports tin-plates, cast iron, timber, marble, bark, slates, lead ore, bricks, grain, butter, and eggs. The Welsh language is used in most of the churches. C. is a co. borough, having a separate jurisdiction from the shire. It unites with Llanelli in returning one member to parliament. Pop. '91, 10,338. There is a college for Welsh teachers. Near C. are the remains of two Roman camps. In the 5th c., Merlin, the Welsh prophet, is said to have been born here. It was long the residence of the native princes of South Wales. Caermarthen castle often changed hands in the contests of the Welsh chiefs with each other, and in the subsequent wars with the Saxons and Normans.

**CAERMAR'THENSHERE**, a maritime co. in South Wales, on the Bristol channel; bounded n. by Cardigan, from which it is separated by the Teify; e. by Brecknock; s. by Glamorgan and Caermarthen bay; and w. by Pembroke. It is the largest of the Welsh counties; length, 58 m.; greatest breadth, 33 m.; area, 918 sq.m., nearly a third of which is waste. The county is mountainous in the n. and e., and is characterized by productive though narrow valleys and deep, wooded glens. Caermarthen Van or Beacon rises to the height of 2596 ft., being the greatest elevation in the county. The coast of C. is marshy, and is all situated on Caermarthen bay, which washes also small portions of the coasts of Glamorgan and Pembroke, is 17 m. across, 10 m. deep, 35 in circuit, and receives the rivers Taff or Tawe, Towy, and Lhoughor. The chief rivers of C. are the Towy, Cothy, Taff, and Teify. The Towy has a course of 60 m., of which 50 are in Caermarthenshire. It yields plenty of salmon, sewin, trout, eels, and lamprey, and is navigable for the last 9 m. of its course. On this river is the celebrated vale of the Towy, 80 m. long, with an average breadth of 2 miles. C., n. and w. of the Towy, comprising three fourths of the county, consists of lower Silurian clay-slate and grauwacke. In the s.e. corner of the county is a band of carboniferous limestone and grit, to which succeeds a small part of the South Welsh coal-field of Glamorgan and Monmouth, chiefly composed of stone-coal and culm. The mineral productions of the county are iron, coal, copper, lead, slates, lime, dark-blue marble. These, with tinned iron, grain, cattle, horses, sheep, and butter, are exported. The climate of C. is mild, but moist; the soil is stiff and poor in the uplands, affording pasturage for small cattle; but the rest of the county is well wooded, and in the s. part along the rivers very fertile. Oats and barley are the chief crops. The chief towns are Caermarthen (the county town), Llanelli, Llandello-vawr, Llandovery, Newcastle-in-Emlyn, and Kidwelly. The chief manufactures are woollens and hides. Pop. '91, 130,560. The county proper sends two members to parliament. The towns of Caermarthen and Llanelli also send a member. The county contains so-called Druidical remains and Roman roads, besides many baronial and ecclesiastical ruins. In this county originated the "Rebecca" riots, which, in South Wales, in 1843-44, were directed against the turnpike-gates.

**CAERNARVON** (*Caer-yn-ar-Rhon*, Fort opposite Mon or Anglesea), a parliamentary and municipal borough and seaport in North Wales, the capital of Caernarvonshire, situated near the s. end of the Menai strait, on the right bank of the Selont, 245 m. n. w. of London. C. has a castle situated at the w. end of the town, the building of which was commenced by Edward I. in 1284. It is one of the noblest ruins in the kingdom, the walls being still entire, and inclosing an oblong of three acres. The walls are 7 to 9 ft. thick, and are pierced by a covered gallery, with loop-holes to discharge arrows. There are thirteen embattled towers, with five, six, or eight sides, and surmounted by turrets. The gateway under the great square tower has four portcullises. The town itself was once surrounded by walls and round towers. These walls, with several of the gates, still exist, but are now within the town. The streets are narrow, but regular, and at right angles to each other. In the churches and chapels, the services are in Welsh and English. C. unites with Pwllheli, Nevin, Criccieth, Conway, and Bangor in returning one member to parliament. It is an important commercial centre. The harbor admits ships of 400 tons. The chief exports are copper ore, coal, and slates, which are brought into the town by rail from quarries in the neighborhood. There is also a great iron and brass foundry. There are manufactures of writing slates, enamelled slate slabs, and tobacco. C. is a bathing place, and is much frequented by tourists, on account of its vicinity to the grandest scenery in North Wales. Many families of the upper ranks reside in and around the town. Pop. '91, 10,287. Half a mile from C. are the remains, covering seven acres, of Segontium, or Caer Seiont, a Roman station or city. Gold, silver, and copper coins and ornaments, and other Roman relics, have been found here. There is a Roman fort on the left bank of the Selont, still almost complete, with walls 11 ft. high, and 6 ft. thick, and with parallel rows of holes 8 in. in diameter. C. was the seat of the native princes of North Wales down to 878. In 1284 was born here the first Anglo-Norman prince of Wales, afterwards the unhappy Edward II. In 1294, the town and castle were burned, and the English inhabitants massacred by the Welsh under Madoc, the illegitimate son of Llewelyn, a native prince of Wales. From a rocky height near Uxbridge hotel, there is a fine view of Snowdon and the island of Anglesea.

**CAERNARVONSHIRE**, a maritime co. in North Wales, bounded n. by the Irish sea; e. by Denbigh, with the Conway between; s. by Merioneth and Cardigan bay; and w. by Caernarvon bay and the Menai strait, the latter separating it from Anglesea. It is 51 m. long; greatest breadth, 22 m.; average, 9; area, 568 sq. m., of which  $\frac{1}{4}$  is in pasture, and only  $\frac{1}{16}$ th in tillage. The surface is mountainous, and is traversed by the grandest and highest ranges in South Britain, and it is the highest and most mountainous county in North Wales. The Snowdonian or chief range runs through the middle of the greatest length of the county, from s. w. to n. e., and is very bold and rocky. It attains the greatest elevation in Snowdon (q. v.), 3571 ft., in the center of the county, and the highest mountain in South Britain. Caernarvon bay is 80 m. across, 15 long, with 2 to 30 fathoms water, and communicates with the Irish sea through the Menai strait, which is 17 m. long, and  $\frac{1}{2}$  to 4 m. broad. The rivers of C. are numerous, but small, from the nearness of all parts of the county to the sea. The Conway, navigable for 10 m., which runs along the e. border, is the chief. Almost all the streams flow through small lakes or tarns—of which there are 50 or 60 in the county—around the central or Snowdonian group of mountains. There are many fine cataracts on these streams. The mineral products of C. are copper, lead, zinc, coal, roofing and writing slates, slabs, chimneys, piers, honestone. The slate quarries employ many thousands of workmen. The climate is mild in the peninsular part of C., but severe among the hills. The chief branch of rural industry in C. is the rearing of black cattle for the dairy, and of small sheep. Wheat, oats, barley, and potatoes are raised in the valleys. Pop. '91, 117,283. The chief towns are Caernarvon (the county town), Bangor, Pwllheli, Conway, Nevin, and Criccieth. In addition to the above boroughs, several flourishing towns have recently sprung into existence in the county—Llandudno, Tremadoc, and Bethesda being the principal. It returns two members to parliament—one for the county, and one for the six chief towns. Connected with C. is the Chester and Holyhead railway, on the great route from London to Dublin, which crosses into Anglesea by the Britannia tubular bridge over the Menai strait. C. contains the remains of British or Celtic camps and hill-forts, especially around Snowdon, several dolmens and stone circles, and some ancient castles. The Snowdonian mountains were long the stronghold of the Welsh against the Romans, Saxons, and Normans in their efforts to subjugate Wales, and here the Welsh were at last defeated in 1283 by Edward I.

**CUSCUTIFOLIA**, a genus of trees of the natural order *leguminosae* (q. v.), the type of the sub-order *cuscutifoliae*. This sub-order is characterized by irregular flowers, which are not papilionaceous (q. v.), and contains upwards of 700 known species, among which many are notable for their purgative properties, as senna (q. v.); some produce eatable fruits, as the tamarind (q. v.), the carob (q. v.), and the West Indian locust tree (q. v.); some yield resinous and balsamic products, as copaiba (q. v.), aloes-wood (q. v.), etc.; some produce important dye-woods, as logwood (q. v.), Brazil wood (q. v.), camwood (q. v.), etc.; and some are trees of great size, and very valuable for their timber, as the purple-wood (q. v.) and the wallaba trees of Guiana. No species of the sub-order



is British, and it generally belongs to warm climates.—The genus *C.* contains a number of species, trees with pinnate or bipinnate leaves, natives of the warm parts of Asia and America, which yield the Brazil wood, Pernambuco wood (see BRAZIL WOOD), and sapan wood (q.v.) of commerce, also the astringent pods called dividivi (q.v.), used in tanning.

**CÆSALPINUS, OR CÆSALPINO, ANDREAS**, 1519–1603; an Italian philosopher of whose family or descendants nothing is known. He first appears as professor of botany in the university of Pisa, where he seems to have studied, and perhaps taught, anatomy and medicine. In his first work, *Speculum Artis Medica Hippocraticum*, he left proof, in a passage often quoted, that he had a clear idea of the circulation of the blood, at least through the lungs. In botany he was more original, and his works are highly philosophical and valuable, being a rich mine from which Linnæus, Morrison, and others took their ideas of botanical arrangement. He died in Rome in attendance upon pope Clement VIII.

**CÆSAR**, the name of a patrician family of the *Julia Gens*, one of the oldest in the Roman state, claiming to be descended from Iulus, the son of Æneas. When or from what cause the surname of *C.* was first acquired, is in the highest degree uncertain. Spartianus, in his *Life of Ælius Verus*, mentions four different opinions respecting its origin: 1. That the word signified an elephant in the language of the Moors, and was given as a surname to one of the Julii because he had killed an elephant; 2. That it was given to him because had been cut (*cæsus*) out of his mother's womb after her death; 3. Because he had been born with a great quantity of hair (*cæsaries*); or, 4. Because he had azure-colored eyes (*cæsi*). The opinion to which we most incline is the third of these, but who was the original "shock-head" of the gens we cannot say; the first, however, mentioned in history is Sex. Julius Cæsar, prætor in 208 B.C. The greatest individual of the family, and one of the greatest men the world has ever seen, was—

**CÆSAR, CAIUS (OR RATHER GAIUS) JULIUS**, son of a Roman prætor of the same name, was b. 12th July, 100 B.C. Two circumstances conspired to determine his sympathies in favor of democracy, and against a republican oligarchy: the first was the marriage of his aunt Julia with Caius Marius; the second, the marriage of *C.* himself, in 88 B.C., with Cornelia, daughter of L. Cinna, one of the principal enemies of Sulla. The anger of the dictator at this cost *C.* his rank, property, and almost his life itself. Feeling that he would be safer abroad for a time, he went to Asia, 81 B.C.; but on learning of the death of Sulla (78 B.C.), he hurried back to Rome, where he found the popular party in a state of great ferment, and anxious to regain what it had lost under the vigorous despotism of the aristocratic dictator. *C.*, however, took no part in the attempts of Lepidus to overthrow the oligarchy; but he showed his political leanings by prosecuting (77 B.C.) Cn. Dolabella—a great partisan of Sulla—for extortion in his province of Macedonia. To improve his eloquence, he went to Rhodes to study under the rhetor Apollonius Molo. In 74 B.C., he returned to Rome, where he had been elected pontifex, and now for the first time threw himself earnestly into public life. In the year 70 B.C., he attached himself to Pompey, whose political actions at this time were of a decidedly democratic character. In 68 B.C., *C.* obtained a questorship in Spain. On his return to Rome (67 B.C.), he married Pompeia, a relative of Pompey, with whom he was daily becoming more intimate. In 66 B.C., he was elected to the curule ædileship, and lavished vast sums of money on games and public buildings, by which he increased his already great popularity. For the next few years, *C.* is found steadily skirmishing on the popular side. In 63 B.C., he was elected pontifex maximus, and shortly after, prætor. During the same year occurred the famous debate on the Catiline conspiracy, in which the aristocratic party vainly endeavored to persuade the consul, Cicero, to include *C.* in the list of conspirators. In 62 B.C., Pompey returned from the east, and disbanded his army. Next year, *C.* obtained the province of *Hispania Ulterior*. His career in Spain was brilliant and decisive. On his return, he was elected consul, along with M. Calpurnius Bibulus. Shortly before the passing of the agrarian law (59 B.C.), *C.*, with rare tact and sagacity, had reconciled the two most powerful men in Rome, who were then at variance, Pompey and Crassus, and had formed an alliance with them, known in history as the *First Triumvirate*. Both of these distinguished men aided *C.* in carrying his agrarian law; and to strengthen still further the union which had been formed, *C.* gave Pompey his daughter, Julia, in marriage, though she had been promised to M. Brutus; while he himself also married Calpurnia, daughter of L. Piso, his successor in the consulship. On the expiry of his term of office, he obtained for himself, by the popular vote, the province of *Gallia Cisalpina* and *Illyricum* for five years, to which the senate added—to prevent the popular assembly from doing so—the province of *Gallia Transalpina*. Nothing could have been more favorable for *C.*'s aims. He had now an opportunity of developing his extraordinary military genius, and of gathering round him an army of veterans, whom perpetual victory should inspire with thorough soldierly fidelity and devotion to his person. This was the very thing he wanted to give him a reputation equal to that of his coadjutors, Pompey and Crassus, whom, in genius, he far surpassed. Leaving, therefore, the political factions at Rome to exhaust themselves in petty strifes, *C.*, in 58 B.C., after the banishment of Cicero, repaired to his provinces, and during the next nine years conducted those splendid campaigns in Gaul, by which, had he done

nothing else, he would have "built himself an everlasting name." C.'s first campaign was against the Helvetii, whom he totally defeated near Bibracte (Autun). Out of 868,000 only 110,000 remained. These were commanded by C. to return home and cultivate their lands. The eyes of the Gauls were now turned upon the new conqueror. His help was solicited, among others, by Divitiacus, an Æduan chief. This involved C. in a second war with a German prince, named Ariovistus, who was utterly overthrown; and now C., having in the course of one campaign successfully concluded two important wars, led his troops into winter quarters.

Next year (57 B.C.) occurred the Belgic war, in which C. successively routed the Suessiones, Bellovaci, Ambiani, and Nervii, who, alarmed at the progress of the Roman arms, had entered into an alliance with each other against the invaders. When the senate received C.'s official dispatches, it decreed a thanksgiving of 15 days—an honor never previously granted to any other general. During the winter and the spring following, C. stayed at Lucca; and, after spending large sums of money in hospitality, and in other less praiseworthy purposes, he departed for Gaul, where the flames of war had burst out in the north-west. The Veneti, a maritime people of Brittany, were the chief instigators of the insurrection. C.'s plans were laid with consummate skill, and were crowned with the most splendid success. The Veneti were totally defeated, and most of the other Gallic tribes were either checked or subdued. C. wintered in the country of the Aulerci and Lexovii (Normandy), having, in the course of three campaigns, conquered Gaul. Next year (55 B.C.), Crassus went to Syria, and Pompey to Spain, while C.'s provincial government was prolonged for five years. He now undertook a fourth campaign against two German tribes who were about to enter Gaul. He was again successful; and pursuing the fleeing enemy across the Rhine, spent 18 days in plundering the district inhabited by the Sigambri. He next invaded Britain, about the autumn; but after a brief stay in the island, returned to Gaul. The Roman senate, astonished at his hardihood and his successes in regions where no Roman army had ever been before, accorded him a public thanksgiving of 20 days. In 54 B.C., C. opened his fifth campaign by a second invasion of Britain. On his return to Gaul, C. was compelled—on account of the scarcity of corn, arising from drought—to winter his army in divisions. This naturally aroused the hopes of the Gauls, who thought the time had come for recovering their independence. An insurrection broke out in the n.e. of Gaul, which was at first partially successful, but was ultimately crushed. C. resolved to winter at Samarobriva (Amiens), in the vicinity of the malcontents. In 53 B.C., C. commenced his sixth campaign. It was chiefly occupied in crushing a second insurrection of the Gauls. C. now returned to northern Italy, that he might be able to communicate more easily and securely with his friends at Rome. That city was gradually becoming more anarchic, the evils of weak government more apparent; the hour for decisive action seemed to be approaching, and doubtless C.'s heart beat with expectation of the mighty future, when all at once the plot that fate was weaving in his favor appeared to be completely marred by a tremendous rebellion over the whole of Gaul, headed by a young warrior named Vercingetorix. It was in the dead of winter when the news came to C., who instantly saw that, at all hazards, he must preserve his fame and his army. Leaving, therefore, Pompey to succeed at Rome, he hurried to meet the insurgent hordes. His great difficulty was to collect his scattered legions. First crossing, with some cisalpine and provincial troops, the mountains of Auvergne, though they lay 6 ft. deep in snow, he suddenly appeared among the Arverni, who, terrified at his unexpected approach, sent for their chief, Vercingetorix, to come to their assistance. This was what C. wished. After some wonderful exhibitions of military skill and numerous successes, Vercingetorix was shut up in Alesia (Alise in Burgundy) with all his infantry. C. besieged him, and though harassed by nearly 800,000 Gauls without, who attempted, but in vain, to break through the well-defended Roman lines, forced Vercingetorix to capitulate. Many of the tribes now hastened to submit to C., who prudently determined to winter among the vanquished. The senate, of course, voted him another public thanksgiving. Next year (51 B.C.), C. proceeded to quell the tribes who still held out. This he successfully accomplished, and having in addition reduced the whole of Aquitania, passed the winter of his eighth campaign at Nemetocenna, in Belgium, where he spent the time both in a magnanimous and politic manner. The Gallic princes were courteously and generously treated; the common people were spared the imposition of further taxes, and everything was done to render it possible for him to visit Italy with safety in the spring. This he did, and took up his residence at Ravenna, where he was informed of everything that was going on by the tribune C. Curio. There can be no doubt that at this moment he was the most popular man in the state, while his soldiery were devoted to him with a loyalty as enthusiastic as that which Bonaparte inspired when fresh from his Italian victories.

Meanwhile, Pompey, whose vanity could not endure the greatness of C., had been gradually veering round again to the aristocracy, whose dread of the new conqueror was hourly increasing. After much futile diplomatic finessing on all sides, the senate carried a motion "that C. should disband his army by a certain day; and that, if he did not do so, he should be regarded as an enemy of the state." The tribunes, Mark Antony and Q. Cassius, put their veto on this motion; but they were violently driven out of the senate-chamber, and, fearing for their lives, they fled to C.'s camp. The

senate, in the madness of their terror, now declared war, and intrusted the conduct of it to Pompey, whose pride in the invincibility of his military prowess hindered him from taking the necessary measures for the defense of the state. He fancied that his name would bring thousands to his standard, and he was even led to believe that C.'s troops were willing to desert their general: the result of which delusion was, that when hostilities formally commenced, he had hardly any soldiers except two legions which had recently been in the service of his rival. C., on the other hand, perceiving that the time for decisive action had at length come, harangued his victorious troops, who were willing to follow him anywhere; crossed the Rubicon (a small stream which separated his province from Italy proper), and moved swiftly, amid the acclamations of the people, towards Rome. Pompey fled to Brundisium, pursued by C., but contrived to reach Greece in safety, 17th March, 49 B.C. The Italian cities had everywhere gladly opened their gates to the conqueror as a deliverer. In three months, C. was master of all Italy.

C. next subdued Pompey's legates in Spain, who were at the head of considerable forces. On his return, he took Massilia, where he learned that he had been appointed dictator of the republic—a function which at this time he retained only for 11 days, but these were honorably distinguished by the passing of several humane enactments. Pompey, now thoroughly alive to the magnitude of his danger, had gathered, in Egypt, Greece, and the east, a powerful army, while his fleet swept the sea. C., however, crossing the Adriatic at an unexpected season, made a rush for Dyrrhachium, where Pompey's stores were; but was nevertheless outstripped by his opponent. Pompey intrenched his army on some high ground near the city, where he was besieged by Cæsar. The first encounter was favorable to Pompey, who drove back C.'s legions with much loss. The latter now retreated to Thessaly, followed by his exulting enemies. A second battle ensued on the plains of Pharsalia, 9th Aug., 48 B.C. Pompey's army was utterly routed; Pompey himself fled to Egypt, where he was murdered. See POMPEY.

No sooner had the news reached Rome, than C. was again appointed dictator for a year, and consul for five years. He was invested with tribunicial power for life, and with the right of holding all the magistral comitia except those for the election of the plebeian tribunes. He did not, however, return to Rome after the battle of Pharsalia, but went to Egypt, then in a distracted condition on account of the disputes regarding the succession. Out of love for Cleopatra (who subsequently bore him a son), he entered upon the "Alexandrine war," in which he was successful, and which he brought to a close in Mar., 47 B.C. He next overthrew a son of Mithridates, near Cela, in Pontus, Aug. 2 of the same year, and arrived in Rome in September. He was once more appointed dictator, and the property of Pompey was confiscated and sold. Before the close of the year, he had set out for Africa, where his campaign against the Pompeian generals, Scipio and Cato, was crowned with victory at the battle of Thapsus, 6th April, 46 B.C. Cato committed suicide at Utica, and with such irresistible celerity was the work of subjugation carried on, that by the end of the summer C. was again in Rome. Now occurred that display of noble and wise generosity which proves C. to have been possessed of a great magnanimous nature. He was not a man that could stoop to the vulgar atrocities of Marius or Sulla, and so he majestically declared that henceforth he had no enemies, and that he would make no difference between Pompeians and Cæsarians. His victories in Gaul, Egypt, Pontus, and Africa were celebrated by four great triumphs, during which the whole Roman populace was feasted and fêted by the magnificent liberality of the dictator.

He now proceeded to check, by wholesale enactments, as far as in him lay, the social evils which had long flourished in the city. During the year 46 B.C., also, he conferred a benefit on Rome and on the world by the reformation of the calendar, which had been greatly abused by the pontifical college for political purposes. After quelling an insurrection which now broke out in Spain, where Pompey's sons, Cneius and Sextus, had collected an army, he received the title of "Father of his Country," and also of *imperator*, was made dictator and *præfectus morum* for life, consul for 10 years; his person was declared sacred, and even divine; he obtained a body-guard of knights and senators; his statue was placed in the temples; his portrait was struck on coins; the month Quintilis was called Julius in his honor; and on all public occasions he was permitted to wear the triumphal robe. He now proposed to make a digest of the whole Roman law for public use, to found libraries for the same purpose, to drain the Pontine marshes, to enlarge the harbor of Ostia, to dig a canal through the isthmus of Corinth, and to quell the inroads of the barbarians on the eastern frontiers; but in the midst of these vast designs he was cut off by assassination on the ides (15th) of Mar., 44 B.C. The details of this crime—the greatest disaster that could have befallen the Roman world, as subsequent events showed—are too familiar to require narration. It is sufficient to say that, of the sixty aristocrats who were in the conspiracy, many had partaken of C.'s generosity, and all of his clemency. A few, like Brutus, out of a weak and formal conscientiousness, based on theory rather than insight, were probably offended by C.'s desire to change the form of government into a hereditary monarchy; but the most, like Cassius, were inspired by a spleenful hatred of the dictator, and the base ambition of regaining power at all hazards.

C., who was 56 years of age when he was murdered, was of a noble and kingly pres-

ence, tall of stature, and possessing a countenance which, though pale and thin with thought, was always animated by the light of his black eyes. He was baldheaded (at least in the latter part of his life), wore no beard, and though of a rather delicate constitution naturally, he ultimately attained to the most vigorous health. His besetting sin was sensuality; but without meaning to detract from the criminality of his conduct in this respect, it may be said that it was as much the sin of the times in which he lived as his own, and that the superlative grandeur of his position gave a prominence to his licentiousness which a more humble lot would have escaped. His intellect was marvelously versatile. In everything he excelled. He was not only the first general and statesman of his age, but he was—excepting Cicero—its greatest orator. As a historian, he has never been surpassed and rarely equaled in simplicity and vigor of style, and in the truthfulness with which he narrates events of which he was an eye-witness. He was, in addition, a mathematician, philologist, jurist, and architect, and always took great pleasure in literary society. Most of his writings have been lost, though their titles are preserved; but we still possess his invaluable *Commentarii* (generally known as "Cæsar's Commentaries on the Gallic and Civil Wars"). The *editio princeps* was printed at Rome 1449. C.'s life was formally written in ancient times by Suetonius and Plutarch. There are modern lives by Delorme, Napoleon III. (1865), and J. A. Froude (1879). The best edition of his works is that of Dinter (1890). For his campaigns, see Dodge's *Cæsar* (1892).

**CÆSAR**, Sir JULIUS, 1558-1636; an English statesman, educated at Oxford and the university of Paris; doctor of civil and canon law. He was master of the rolls, and held other high offices under Elizabeth and James I.

**CÆSARE'A** (*Turris Stratonis*), called by the natives "Kaisari'yeh." This once proud and splendid seaport, perhaps one of Herod's most magnificent works—a Grecian town with its temples, amphitheater, baths, etc., imported into Syria—was situated on the coast of Syria, 95 m. s. of Beyrout, and 37 m. n. of Jaffa.

In 65 A.D., Gessius Florus, the worst of all petty tyrants that had afflicted Judea, was appointed governor of Cæsarea. About that time, a terrible revolution, which commenced at C., broke out all over Judea. It arose from a dispute between the Syrian and Jewish citizens of C. as to which of them the city really belonged to; and some idea may be formed of the extent of the insurrection from the fact that above 20,000 Jews were massacred in C. in the space of one hour; 18,000 in one night at Scythopolis; 50,000 at Alexandria; 8000 at Joppa; and 10,000 at Damascus.

C. was occupied by the crusaders; after them, it seems to have gradually decayed into nothingness. It is now a heap of half-buried ruins.

**CÆSARE'A PHILIPPI** (*Panion*). This town, mentioned in Matt. xvi. 13, was situated about 20 m. n. of the sea of Galilee. It was distinguished from the Cæsarea on the coast of Syria by the appendage of "Philippi," given to it in honor of Philip the tetrarch, who repaired the city. It is now a heap of ruins, overgrown with bushes and grass.

**CÆSAREAN OPERATION** (*cædo*—*cæsus*) has, from very ancient times, been the popular name for *hysterotomy* (*hystera*, uterus; *tome*, section). Pliny distinctly alludes to it in his *Natural History* (lib. vii. cap. ix.), saying that Cæsar was so called from being taken by excision out of the womb of his mother, and that such persons were called *Cæsones* (Cæsar a *cæso* matris utero dictus; quâ de causâ *Cæsones* appellati). In his case, the mother must have survived the operation, as Aurelia was alive when her son invaded Britain.

The pages of a popular work scarcely allow of the details of such a proceeding, but we may state that the first incision is made exactly in the middle line of the body, to the length of 6 or 7 inches. When the uterus is exposed, it must be carefully opened, the child lifted out, and then the after-birth. The uterus now contracts, and sinks down into the pelvis, the wound is closed, and opium is given to the patient to allay pain and nervous irritability.

In Great Britain, the C. O. has been rarely performed, most likely from the skill of the accoucheurs rendering such a proceeding unnecessary; but still several cases are on record where not only the child, but the mother, was saved. Some women, indeed, seem to have accepted it as their usual method of delivery, having several children, each requiring to be removed through an abdominal incision; one woman submitted to it seven times. It has also been successfully performed in most unfavorable circumstances. In the year 1500, a sow-gelder operated successfully on his own wife; an illiterate Irish midwife, Mary Donally, operated with a razor on a poor farmer's wife in Jan., 1788, and removed a dead child; her patient completely recovered, so as to be able to walk a mile on foot on the 27th day after the operation. Nay, a negro woman in Jamaica cut herself open with a butcher's knife, removed her infant, and recovered. Practitioners are not quite decided as to the circumstances which justify the performance of this severe operation on the living female, but all agree on the propriety of at once removing by it the child of a recently dead woman. Numa Pompilius decreed that every pregnant woman who died should be opened; and the senate of Venice, in 1608, decreed that practitioners should perform, under heavy penalties, the C. O. on pregnant women supposed to be dead. In 1749, the king of Sicily decreed the punishment of death to

medical men who omitted to perform it on women dying when advanced in pregnancy. Of course, to be of any use, it must be performed immediately.

**CÆSARIUM**, in its historical aspect denotes a pure despotism, at once military, civil, judicial, and religious, professedly maintained in the interest of the people; such a despotism, in fine, as that of the Roman empire under the Cæsars. In its modern acceptation, since in the more civilized nations the permanent possession of these powers untrammelled by constitutional limitations is rarely, if ever, vested in a single person, the word is often applied to a temporary political dictatorship arising in the confusion of revolutionary commotions and in the disorganization of parties. It invariably implies the idea of a government good or bad, according to the character of the person who exercises it.

**CÆSIUM**. See **RUBIDIUM**.

**CÆSURA**, a pause or division in a verse; a separation by the ending of a word, or by a pause in reading, of syllables rhythmically connected, as in this line: "These parting num-bers, ca-denced by my grief."

**CAF**, or **KAF**, the mountain, or range of mountains, that in Arabic and Persian fiction surrounds the earth. The pivot on which the mountain rests is a great emerald from which the sky receives its colors, and the mountain is the dwelling-place of giants and genii. "From Kaf to Kaf" signifies from one to the other end of the world.

**CAFFA**. See **KAFFA**.

**CAFFARELLI**, or **GAFFARELLI**, GAËTANO MAJORANO, 1708-83; an Italian vocalist who, when a boy, was properly qualified for singing feminine parts, and was deemed the first soprano of the age. He was highly successful for many years, having no rival excepting possibly Farinelli; and he had success as a composer also. On returning to private life he built a palace, over the entrance of which he inscribed: "Amphion built Thebes; I this house," alluding to the story that the walls of Thebes rose without hands to the music of Amphion's lyre.

**CAFFEÏNE**, or **THEÏNE**,  $C_8H_{10}N_4O_2 + H_2O$ , is the alkaloid or active principle of coffee (q.v.) and tea (q.v.). When isolated, it forms beautiful white crystals, with a silky luster, which are soluble in water, alcohol, and ether. It is present in coffee to the extent of about 1 per cent, and in ordinary or Chinese tea, from  $2\frac{1}{2}$  to 6 per cent; and is also found in Paraguay and Guiana teas. It may be extracted from coffee or tea by making a decoction in hot water, and adding acetate of lead, which causes a precipitate of caffeotannate of lead. When the latter is acted on by sulphuretted hydrogen, the lead is separated, and the C. left in solution. On evaporation of the liquid, and recrystallization from alcohol, the C. separates in crystals.

**CAFFER BREAD**, a name given to several species of *encephalartos*, trees of the natural order *cycadaceæ* (q.v.), which, like many others of that order, have much starch in their stems, and afford food to the natives of South Africa. They are also called bread-trees.

**CAFFERS**. See **KAFFIRS**.

**CAFFRA'RIA**. See **KAFFRARIA**.

**CAFFRISTAN'**. See **KAFIRISTAN**.

**CAFTAN**. See **KAFTAN**.

**CAGLI**, a walled t. in the province of Urbino, Italy, at the confluence of the Cantiano and Busso, where there is an old Roman bridge over the former river. It is a bishop's seat, and has several monasteries, in one of which is a famous fresco by Giovanni Sanzio, the father of Raphael. Leather manufacturing is the chief business. Pop. about 10,000.

**CAGLIARI**, the capital of the island of Sardinia, situated on the side of a hill, on the n.e. shore of a spacious bay, and on the s. coast of the island, in lat.  $39^{\circ} 13'$  n., long.  $9^{\circ} 8'$  east. It has a spacious and safe harbor, defended by several forts, and is the emporium of all the trade of the island. The town contains many public buildings and churches, and has a university with 100 students; but its streets, for the most part, are very narrow, steep, and dirty. C. had a pop. of (1894) 44,800. It has also a dockyard, and a good road was some years ago constructed from C. to Sassari, the second city in the island, and to some of the more considerable places. Steamers ply very frequently between C. and Genoa; and it is now united to the continent of Europe by a line of electric telegraph.

**CAGLIARI**, PAOLO, best known as *Paolo Veronese*, an Italian painter of great eminence, was b. at Verona in 1528. He first studied under his uncle, Antonio Badile, a respectable artist, and afterwards settled in Venice, where he rapidly acquired both wealth and reputation. He had for contemporaries both Titian and Tintoretto, and was held in equal admiration with these famous painters. The church of San Sebastiano, in Venice, contains many of his productions, which are reckoned the most important of his earlier period—i.e., the period before he visited Rome, when he first became acquainted with the masterpieces of Raphael and Michael Angelo. The influence of the Roman school on his style was so happy, that, on his return, he received the honor of knighthood from the doge. He died 19th April, 1588. C. is remarkable for the fertility of his

imagination. His design is generally noble, his composition rich, and his execution truthful. In the invention of details, especially, he is inexhaustible, and often overloads his pictures with ornament. One peculiarity of his works is the frequent introduction of splendid architectural backgrounds, which, however, were generally painted by his brother Benedetto. The most celebrated of his productions is the "Marriage Feast at Cana of Galilee," now in the Louvre at Paris. It is 20 ft. high, and 80 in length, and contains 180 figures. Besides these may be mentioned "The Calling of St. Andrew to the Apostleship," "The Feast of Simon," and the "Presentation of the Family of Darius to Alexander."

**CAGLIOSTRO**, Count **ALESSANDRO DI**, a notorious impostor, who, in the latter part of the 18th c., traveled through Europe, and whose adventures afford considerable insight into the social characteristics of his times. He was born at Palermo, of poor parentage, June 2, 1743, and his true name was **GIUSEPPE BALZAMO**. Carlyle's picture of him when a boy—"brass-faced, vociferous, voracious"—is probably accurate, and already prophesies the bold and boisterous quack. When 18 years old, he ran away from the seminary of St. Roch, and was afterwards sent to a monastery at Cartagione. Here he became assistant to the apothecary of the monastery, and picked up that scanty knowledge of chemistry and medicine, which was afterwards found quite sufficient to impose upon so many respectable individuals. His conduct in the monastery was in keeping with his character, but finding it too contracted a sphere for the development of his ambitious genius, he left it, or was ejected, and for a time led "the loosest life" in Palermo. When 26 years old, he found it highly advisable to leave his native place. In company with a certain sage named Althotas, C. is vaguely represented as traveling first in some parts of Greece, Egypt, and Asia. At Rome, "his swart, squat figure first becomes authentically visible in the Corso and Campo Vaccino. He lodges at the sign of the Sun in the rotunda, and sells etchings there," very hard up at this time. In Venice, "the bull-necked forger" contrived to marry a very pretty woman named Lorenza Feliciana, who became a skillful accomplice in his schemes, and captivated many admirers, while C. picked their pockets. C. now made the tour of Italy with great success as a physician, philosopher, alchemist, freemason, and necromancer. Next, he extended his victorious career through some parts of Germany, and especially carried on a lively business in his "elixir of immortal youth," which became very popular among the ladies. By virtue of this fine medicine, the count assured his patients that he had already attained his 150th year, while his young and charming wife often talked affectionately of her son as "a commander in the Dutch navy." Through Courland, the count and his accomplice advanced triumphantly to the court of St. Petersburg, where he seems to have first made a failure; for the empress Catharine, aided by her Scotch physician, Rogerson, a keen-witted native of Annandale, who skeptically examined his famous "Spagiric food," and pronounced it "unfit for a dog," penetrated his real character, and made him the subject of a comedy. C. soon found it convenient to vanish. We next find him at Warsaw, discoursing on his pet Egyptian masonry, medical philosophy, and the ignorance of doctors, but he had the misfortune to be unmasked by a certain count M. This, however, had little effect on the stupid credulity of C.'s dupes—belonging, it must be remembered, to the upper classes, who in that age, according to Carlyle, were at once sensual, infidel, and superstitious—so that they persisted for a time in "distending his pockets with ducats and diamonds," which, however, his lavish dissipation soon scattered to the winds—for this prophet of a new physical and moral regeneration, and inventor of an "invaluable pentagon for abolishing original sin," was a desperate gambler. In 1780 he went to Strasburg; and soon afterwards we find him in Paris, still founding lodges of "Egyptian freemasons," holding nocturnal meetings for calling "spirits from the vasty deep," etc., and scandalously simulating the character and deeds of a philanthropist. From Paris he went over to England, where he was cordially received by the followers of Swedenborg. On his return to Paris (1785), he became distinguished at court, was intimate with the weak and credulous cardinal Rohan, and played a prominent part in the affair of the diamond necklace (q. v.). This lodged him in the Bastille, but he cleared himself by a statement which gained credit, and, after being liberated, carried on his adventures once more in England, but feebly the sunshine of success now obviously growing dim; in short, the count, in gloom and foreboding, disappeared from the island. But the market in Germany, too, was closed, a general distrust having been excited by the revelations of one of the count's dupes. Elsewhere, also, these began to fail him. "At Aix, in Savoy, there are baths, but no gudgeons in them;" at Turin, he is ordered off by the king; a similar fate befalls him at Roveredo; at Trent, we catch a glimpse of him, "painting a new hieroglyphic screen," which, however, attracts no more the gaping crowd; lower still, "he pawns diamond buckles;" finally, his wayworn wife—in whom, perhaps because of her womanhood, the enormous lie and quackery first breaks up—"longs to be in Rome by her mother's hearth, by her mother's grave, where so much as the shadow of refuge awaits her." In May, 1789, he entered the city; on the 29th December, the holy inquisition detected him founding "some feeble ghost of an Egyptian lodge." He was imprisoned, and condemned to death for freemasonry. His sentence was commuted to imprisonment for life in the fortress San Leon, where, in spite of his "elixir of immortal youth," he

died, 1795, aged 53 years. His wife ended her days in a convent. His *Mémoires Authentiques*, posthumously circulated in Paris, were *not* authentic.—See Carlyle's *Miscellaneous Essays*, art. Count Cagliostro.

**CAGNOLA**, LUIGI, MARCHESE, a distinguished Italian architect, was b. at Milan in 1762—d. 1833. Belonging to an ancient and wealthy family, he could afford to follow the bent of his own inclination, and devoted himself earnestly to the study of architecture. His master-works are two triumphal arches. The first is the famous *Arco della Pace*, in Milan, commenced in 1807, but not finished until 1838. It is constructed of white marble, and, with the exception of the *Arc de l'Etoile*, in Paris, is both the largest and noblest structure of the kind in Europe, reaching a height of 78 feet. On the top of the arch is a bronze figure of Peace, in a car drawn by six horses, while the sides are richly adorned with innumerable bas-reliefs. The second forming the *Porta di Marengo*, or *Porta Ticinese*, is also a work of great beauty, and is much admired. Besides these may be mentioned the *campanile* (bell-tower) at Urgnano, in the Bergamese.

**CAGOTS** is the name given to a tribe of men, of manners and customs akin to those of the gypsies, who are found scattered through various parts of Bearn and Gascony, in France. They are usually thought to be the descendants of the Visigoths, who remained in France after their defeat by Clovis, in the 5th century. Until the French revolution of 1790, they received even worse treatment than that which generally falls to the lot of remnants of conquered races. They were forced to wear a peculiar dress, were forbidden to practice all but the most menial trades, and were obliged to live isolated, either in separate villages or in separate quarters of the towns. So complete was their estrangement from the other inhabitants, that they were forced to enter the churches by doors specially set apart for them. Since that revolution, they have been placed, as regards the law, on an equal footing with other citizens, but socially they are still regarded as a degraded race. Their language has been, so far back as is known, a corrupt dialect of that spoken in the surrounding country; but their blue eyes, fair hair, and fair complexion, mark them out as ethnologically distinct, and speak of a Teutonic origin. From a great liability to the diseases afflicting cretins, probably caused by their exposed manner of life and insufficient nourishment, they were at one time erroneously thought to belong to that unfortunate class. Tribes, whose history and present condition greatly resemble those of the C., are to be found in Brittany, where they receive the name of "Caqueux;" and in Poitou, Maine, and Anjou, where they receive the name of "Colli-berts." See Michel's *Histoire des Races Maudites de la France et de l'Espagne* (History of Outcast Races in France and Spain), Par. 1847.

**CAGSA'NA**, a t. near the southern extremity of the island of Luzon, Philippines, with a population of about 13,000.

**CAHAW'BA**, a river rising in Jefferson co., Ala., flowing s.w. through a region rich in coal, and joining the Alabama 8 m. w. of Selma. The C. is navigable by small craft for about 100 miles.

**CAHEN**, SAMUEL, 1796-1863; a French Jew noted as a Hebrew scholar. He translated the Old Testament into French with Hebrew on opposite pages, and with notes and comments. He also founded the *Archives Israélites*, a monthly publication devoted to Jewish questions and interests.

**CAHENSLEYISM**, a name given to the plan proposed in 1862 by the German Catholic Bishop, Cahensley, who advised that the foreign-born population of the United States should be divided, for ecclesiastical purposes, according to their European nationality, under priests speaking their own languages, and of like race. This plan, which would tend to perpetuate in this country the racial divisions of Europe, was vigorously and successfully opposed by Cardinal Gibbons, Archbishop Ireland, and other leaders of the "American party" in the Roman Catholic Church.

**CA'HIE**, or CAHER, a. t. in the co. of Tipperary, Ireland on the Suir, situated at the e. end of a valley between the Galtees and Knockmeledown mountains, 8 m. n.w. of Clonmel. In the town is the seat of the earl of Glengall, with a park which extends along the river for 2 m. below the town. Cahir castle, an ancient irregular Norman structure of considerable extent, is situated on a rock on the left bank of the Suir. It was taken by the earl of Essex in 1599, and by Cromwell in 1650; it has been lately restored. C. has extensive flour-mills, and a pop. of about 2500. There are large barracks near Cahir.

**CAHOES** (anciently *Divona*), a. t. in the department of Lot, France, is situated on a small rocky peninsula, formed by a bend of the river Lot—here crossed by three bridges—about 60 m. n. of Toulouse. The streets of C. are steep and narrow, and present many specimens of antique architecture. It has a fine cathedral, and several Roman remains, including those of a magnificent aqueduct. There is an obelisk to Fénelon, who was a student at the university here. The town was taken and pillaged by Henri of Navarre in 1580. It has manufactures of cotton-yarn, woollens, leather, paper, glass, etc.; the district produces wine in considerable quantities. The pop. in 1872 was 11,416; and in '91, 15,369.

**CATAPHAS**, high-priest of the Jews in the reign of Tiberius Cæsar, at the beginning of Christ's ministry, and also at the time of his trial and crucifixion. His wife was the daughter of Annas, a former high-priest, who still had great influence in sacerdotal matters. In the council summoned by the chief-priests and Pharisees to take action

upon the remarkable spread of the doctrines of Jesus, Caiaphas, was decidedly in favor of putting him to death, using the prophetic language: "Ye know nothing at all; nor consider that it is expedient for us that one man should die for the people, and that the whole nation perish not." Christ was arraigned before Caiaphas, when the effort to convict him on false testimony failed; and then the prisoner was called as a witness and asked if he was indeed the Christ, the son of God. The answer being in the affirmative, the high-priest pretended to be sorely grieved at what he considered blasphemy, and appealed to Christ's enemies to say if that was not enough. The answer was that Christ deserved death, and without remonstrance from the high-priest, they at once fell upon the prisoner with insult and injury. But the high-priest had not the power of final condemnation, that being in the hands of the Roman governor only.

**CAICOS**, or **CAYOS**, or **KEYS**, a term applied to numberless rocky islets of the West Indies, and that generally with a reference to some more considerable island in the neighborhood. Thus, to take the Bahamas as an instance, there are the Keys of Providence, of Eleuthera, of Abaco, etc. But more specifically the name is often appropriated to the south-easterly members of the Bahamas. Though geographically a portion of the Bahamas and formerly under the government of Bahama, they form with Turk's Islands a separate government under the governor of Jamaica. A commissioner, assisted by a legislative board of five members appointed by the Crown, administers the government. There are more than 80 small islands, having an area of about 169 miles, but only 6 are inhabited. The largest is Grand Caicos, which is 20 miles long by 6 broad. The seat of government is at Grand Turk, which has a public library and reading room. The chief industry is salt raking, and a considerable amount of salt is exported annually to the United States, Canada and Newfoundland. There is also a sponge fishery. The pop. in 1891 was 4745.

**CAIFA**, or **HAIFA**, a seaport on the coast of Syria, situated exactly opposite Acre, upon a spur of Mt. Carmel, and on the s. side of a wide semicircular bay, 4 m. across. It is the ancient Hefa, or Sycaminopolis. It covers but a small space of ground, and contains no edifice of any note except a few minarets. The houses are built of rough unhewn sandstone, plastered over with lime—the roofs flat. Pop. about 2000—Moslems, Christians, and Jews. C., having a better anchorage than Acre, is fast eclipsing that city as a port, and in recent years almost all the trade of Acre has been transferred to it. Consular agents from England, France, etc., have been established at C. In the neighborhood a German colony settled in 1870, and Russian Jews have also formed a settlement here. C. is surrounded by beautiful gardens of palm, olive, orange, citron, fig, mulberry, and pomegranate trees.

**CAILLIAUD**, **FRÉDÉRIC**, 1787-1869; a French goldsmith who traveled in various parts of Europe, Egypt, and Asia Minor. He was engaged by Mehemet Ali to explore the deserts along the Nile and near the Red Sea, and in the work discovered the emerald mines of Mt. Zabarah. He returned to France with a valuable collection of antiquities, plants, and minerals, and published *Voyage à l'Oasis de Thebes*, etc. He went again to Egypt and made explorations in the eastern deserts, making an expedition to upper Nubia with Ismael Bey. In 1819-23, he published *Voyage à Meroe*. Among the relics of antiquity brought by him to France and purchased by the government, was a mummy, inscribed with hieroglyphical characters accompanied with a Greek translation, which proved of great help to Champollion in the study of the ancient language.

**CAILLIE**, **RENÉ** or **AUGUSTE**, a French traveler, noted for his journey to Timbuctoo, was born 19th Sept., 1799, at Mauzé, in the department of Deux-Sèvres. Having gone to Senegal, and engaged in trading with the natives, he learned, about 1826, that the geographical society of Paris had offered a premium of 10,000 francs to the first traveler who should reach Timbuctoo. Provided with a stock of goods for barter, C. started from Sierra Leone, Mar. 23, 1827, and after some delay caused by illness, he reached the mysterious city in April, 1828, where he remained 14 days. On leaving Timbuctoo, he accompanied a caravan across the Sahara desert, reaching the coast at Tangier. After hearing and examining his statements, the society awarded him the offered prize, with a pension of 1000 francs, and the order of the legion of honor. His notes of travel, arranged by M. Jomard, were published under the title *Journal d'un Voyage à Tombouctou et à Jenné dans l'Afrique Centrale*, etc. (8 vols., Par. 1830). In England, doubts were raised as to the veracity of C., but without just grounds. C. died at his estate, in the neighborhood of Paris, May 25, 1838.

**CAIMACAN'**, or **KAIMAKAM**, a Turkish officer corresponding with lieutenant or lieutenant-governor. The caimacan of Constantinople is the lieutenant of the grand vizier, whom he represents in processions. Such officers also act as governors in the principal towns.

**CAIN**, the first-born of Adam and Eve. His history, as recorded in the book of Genesis, is mysterious and inexplicable, and the traditions which a later superstition has gathered round it, have thrown no light whatever on its dark perplexity. As the first murderer, his memory has always been profoundly execrated by the Christian church; yet such is the perversity of human nature, that one sect—if not more—of the pseudo-Gnostics found his actions and character so much to their liking, that they called themselves *Cainites* (180 A.D.), and invented an explanation of his alleged crime, which, like



most of the Gnostic heresies in the early church, sprang out of the deep-rooted fundamental error of the "two principles." The Cainites believed that C. was the offspring of the intercourse of a superior power with Eve, and Abel of an inferior power; that their characters corresponded to their paternal parentage, and that the slaying of Abel only symbolized the victory of the superior over the inferior power. The subsequent punishments of C. were regarded as the persecutions of Abel's father—i.e., the Jewish God. For the same reason, they highly honored all the reprobates of the Old Testament—such as the people of Sodom, Esau, Korah, Dathan, and Abiram—whom they looked upon as the victims of the hatred of Jehovah. It is unfortunate that we possess only distorted and fragmentary accounts of this, as of all the other heretical sects. The Cainites are also said to have denied the dogma of the resurrection of the body, to have rejected the New Testament, and accepted a gospel of Judas, the betrayer.

**CAINE**, THOMAS HENRY HALL, b. Runcorn, Cheshire, England, May, 1853; author; visited Canada and the United States to promote international copyright in 1895-6. His publications include *The Shadow of a Crime* (1885); *The Deemster* (1887); *The Manxman* (1893); *The Bondman* (1895); *The Scapegoat* (1891); *The Christian* (1897); sonnets, poems, and criticisms.

**CAIRA**, French revolutionary song, the words by Ladré, a street singer, and the melody originally a popular contre-danse entitled *Carillon National*, a favorite air of Marie Antoinette's. The song is said to have been first sung when the mob marched to Versailles, Oct. 5, 1789. It was prohibited by the law of the 18th Brumaire in 1799.

**CAIRD**, EDWARD, LL.D., educator; b. Scotland, 1824; educated at Oxford university; became professor of moral philosophy in Glasgow University in 1866, and master of Balliol college in 1868; author of *The Critical Philosophy of Immanuel Kant* (1889), *Essays on Literature and Philosophy* (1892), *The Evolution of Religion* (1893), etc.

**CAIRD**, Sir JAMES, b. 1816; an agriculturist of Scotland, author of *High Farming as the Best Substitute for Protection*. In 1850-51 he visited all parts of England as agricultural writer for the *London Times*, his letters being afterwards published in a volume. In 1858 he visited the United States and wrote an account of the western territories. While in parliament he was the originator of agricultural statistics, now annually published by the British government. He was made K.C.B. in 1882, and d. in 1892.

**CAIRD**, Rev. JOHN, D.D., a minister of the established church of Scotland, and one of the most eloquent preachers in Great Britain, was b. at Greenock in 1820. He studied at the university of Glasgow, and in 1845 was ordained to the pastorate of the church of Newton-upon-Ayr, whence in 1847 he was translated to Lady Yester's, Edinburgh. Here his popularity was extraordinary, but the demands made on his physical energies were so great that he found it necessary to retire to the country, and accepted, in 1849, the country charge of Errol, in Perthshire. A sermon which he preached before the queen in 1855, in the church of Crathie, and which was published, by royal command, under the title of *The Religion of Common Life*, was universally admired throughout Great Britain, translated on the continent under the auspices of chevalier Bunsen, who wrote a preface to it, and suddenly carried the fame of the author into all parts of the Protestant world. In 1857, Dr. C. accepted a call to Glasgow. In 1858 he published a volume of sermons, marked by beauty of language, strength of thought, and earnest sympathy with mankind. He received the degree of D.D. in 1860. In 1862, he was appointed professor of divinity, and in 1873, principal of Glasgow university. He published *The Universal Religion* (1874); *Introduction to the Philosophy of Religion* (1880); *The Religions of India* (1881); *Spinoza* (1889), etc.

**CAIRN**, or **CARN**, a Celtic word, signifying a protuberance, a heap, a pile. In that sense, it appears in the names of hills and other natural objects in Scotland, Ireland, Wales, Cornwall, and Brittany. It is also applied to artificial heaps of unhewn stones, which, among archaeologists, have come to be generally known as "cairns."

There are several kinds of cairns. The simplest and most common form seems to be a conical pile of stones of no great size. Next is what may be called the fence or ringed C.—a heap of stones girdled round by large unhewn stones set upright in the ground. Some cairns have two, and a very few have three such concentric girdles; in some instances, there are concentric rows of upright stones within the cairn. Many cairns are found in the neighborhood of the circles of unhewn stone pillars which antiquaries used to style "Druidical." In a few instances, cairns are found at the end of an avenue of standing stones. Some cairns are fenced round by a narrow ditch and a small earthen rampart. A very few cairns have unhewn flat stones on their tops; a still smaller number are surmounted by an unhewn stone pillar. A few are oblong in shape.

Cairns were erected, doubtless, for several purposes. It appears from record that they were often raised to distinguish the marches or boundaries of lands. One C., near Balmoral, on the Highland Dee, is said to have been erected as a mustering-place for the men of Strathdee, who took its name, *Cairn-na-cuimhne*, or "C. of remembrance," for their slogan or war-cry. In later times, places where great crimes had been committed were marked by cairns; thus, "Mushet's C.," in the Queen's park at Edinburgh, shows the spot where a wife was murdered by her husband, under circumstances of peculiar atroc-

ity, in 1720. But that the great purpose of the C. was sepulchral, is shown by the human remains found in so many of them. "*Disiectis et erutis, ossa inveniuntur, et quibusdam honor nominis adhuc manet*," says Robert Gordon of Straloch, writing of Scotch cairns in 1654. "For the cairns or heaps of stones in several parts of Ireland," wrote Thady O'Roddy in 1617, "some of them were heaped as monuments of battles, some made in memory of some eminent persons buried in such a place." A Highland suppliant would have said to his benefactor: *Curri mi cloch er do charne*, "I will add a stone to your cairn." The bones found in cairns are generally calcined or half-burned, and inclosed either in what are called *cists*—small rude coffins of unhewn stones—or in urns of earthenware, which, again, are in many cases protected by stone cists. Along with the bones are often found flint arrow-heads, flint axe-heads, stone hammers, stone rings, glass beads, implements of bone, bones of horses and oxen, spear-heads, and other weapons of bronze. In some instances, human bones are found unburned, inclosed in stone cists about 8 ft. long, or, more rarely, of the full size of a man. In one case, as many as seventeen stone cists were found in one cairn.

Many cairns are of considerable size. Each of three cairns at Memsie, near Fraserburgh, in Aberdeenshire, was about 300 ft. in circumference, and about 40 ft. high. A C. in the parish of Minnigaff, in Galloway, was 891 ft. in circumference. Several of the larger cairns are what is called "chambered"—that is, have internal galleries or cells. Of three large ringed cairns at Clava, on the banks of the Nairn river, near the battlefield of Culloden, one was found to contain a gallery, about 2 ft. wide, leading from the s. side of the C. to a circular chamber in the center, about 15 ft. in diameter, built of unhewn and uncemented stones, each course overlapping the other so as to meet at the top in that sort of rude dome which has received the name of the "beehive house" (q.v.). The Boes C., on the moor of Dranandow, in the parish of Minnigaff, had two galleries crossing each other—each 80 ft. long, 4 ft. wide, and 8 ft. high.

But of all the "chambered" cairns, the most remarkable is that at New Grange, on the banks of the Boyne, near Drogheda, in Ireland. It is 400 paces in circumference, and about 80 ft. high, and is supposed to contain 180,000 tons of stones. In 1699, it was described by Edward Lhwyd, the Welsh antiquary, as "a mount or barrow, of very considerable height, encompassed with vast stones, pitched on end, round the bottom of it, and having another, lesser, standing on the top." This last pillar has disappeared; of the outer ring of pillars, ten still remain, placed at about ten yards one from another. "The cairn," says Mr. Wakeman in his *Archæologia Hibernica* (Dublin, 1848), "in its present ruinous condition, presents the appearance of a grassy hill partially wooded; but, upon examination, the coating of earth is found to be altogether superficial, and in several places the stones, of which the hill is entirely composed, are laid bare. The opening [which is nearly square, and lined by large flags] was accidentally discovered about the year 1699. The gallery, of which it is the external entrance, communicates with a [dome-roofed] chamber or cave nearly in the center of the mound. This gallery, which measures in length about 50 ft., is, at its entrance, 4 ft. high; in breadth about 8 feet. Towards the interior, its size gradually increases; and its height, where it forms the chamber, is 18 feet. The chamber is cruciform, the head and arms of the cross being formed by three recesses—each containing a basin of granite. The sides of these recesses are composed of immense blocks of stone, several of which bear a great variety of carving, supposed by some to be symbolical. The majority of these carvings must have been executed before the stones had been placed in their present positions. The length of the passage and chamber from n. to s. is 75 ft., and the breadth of the chamber from e. to w. 20 feet. Of the urns or basins in the recesses, that to the e. is the most remarkable. It is formed of a block of granite, and appears to have been set upon, or rather within, another of somewhat larger dimensions." The Irish antiquaries believe that the chambered C. of New Grange—"the cave of Achadh Aldai," as it was called, from Aldai, the ancestor of the Tuatha De Danaan kings—was opened and rifled by the Norsemen in 862. About a mile from it, on either side, are other two cairns of nearly equal size, named Knowth and Dowth. The latter was opened in 1847, and found to contain a gallery, a cruciform chamber, a basin or sarcophagus, and carved stones, all of the same type as those of New Grange. Engravings of the sculptures, in both cairns, are given in Mr. W. R. Wilde's *Boyne and Blackwater*, pp. 192-207 (Dublin, 1850), and some of them are obviously of the same character with sculptures found in Scandinavia; at Locmariaker, and at Gavr Innis, in the Morbihan, in Brittany; in one of the cells of a tumulus opened in 1853 at Pickaquo, near Kirkwall, in Orkney; among the ruins of an ancient fort at the Laws, near Dundee; at the ancient forts at Rowtin Lynn, and Old Bewick, in Northumberland; and on one of the standing stones near Penrith in Cumberland, called "Long Meg and her Daughters."

Cairns are most frequent in stony countries. Where, as in many parts of England, stones are scarce, the barrow or earthen mound came in place of the C., from which it differs only in the materials of which it is made. So also in Scandinavia. Cairns, or *dysser*, as they are there called, are rare in Denmark, but of more common occurrence in Sweden and Norway.

**CAIRNES, JOHN ELLIOTT, 1823-75;** b. Ireland; educated at Trinity college, studied law, and was admitted to the Irish bar, but passed most of his time in writing for the

press, chiefly upon economical questions affecting Ireland. In 1856, he was appointed professor of political economy in Dublin, and the next year his professional lectures were published under the title *Character and Logical Method of Political Economy*. He next wrote for *Fraser's Magazine* a series of essays on the gold question, induced by the sudden increase of supply from California and Australia. In 1861, he was appointed professor of political economy and jurisprudence in Queen's college, and in the next year published his work on *The Slave Power*. His conclusions were to a large extent verified by the results of the war in the United States then just commenced. In 1866, he was appointed professor of political economy in University college, London. His later years were spent in collecting and publishing his numerous papers, and in writing his chief work, *Some Leading Principles in Political Economy, newly Expounded*. He is regarded as high authority on subjects connected with political economy.

**CAIRNGORM STONE**, or simply **CAIRNGORM**, a name often given by jewelers, and particularly in Scotland, to brown or yellow quartz or rock-crystal, because found at Cairngorm, in Aberdeenshire. The same mineral is found in many other localities, as at Olivet near Orleans, in Brazil, and in Siberia. In Cairngorm and the neighboring district of Mar, it occurs both in the granite rock and in the alluvial soil. It differs from common colorless quartz or rock-crystal only in the presence of a very little oxide of iron or manganese, to which it owes its color. It is much used as an ornamental stone. The yellow variety is not unfrequently called topaz, although quite different from the true topaz, which it resembles chiefly in color, having neither its hardness nor its brilliancy. The topaz is, however, sometimes found along with it in the granite and gneiss districts of Mar and Cairngorm. The brown variety is sometimes called **SMOXY QUARTZ**, and when of a good and uniform color is by some preferred to the yellow.

**CAIRO**, city, port of entry, and co. seat of Alexander co., Ill., at the junction of the Mississippi and Ohio rivers, on 5 railroads; 149 miles s.e. of St. Louis. It is an important market for the products of the Mississippi valley. Intended to be a great commercial centre, its low site subjected it to inundations until it was protected by strong levees and an embankment. During the civil war it was an important depot of supplies. The Ohio river is here crossed by a railroad bridge 58 feet above high water, which cost \$2,500,000. Over 4000 steamboats land at its wharf yearly. It is principally engaged in commerce and manufacturing, and has the Douglass and Sumner High Schools, Chase Academy, St. Joseph's Female Seminary, public library, national banks, and daily and weekly newspapers. Pop. '90, 10,324.

**CAIRO** (Arabic, *Musr el Kahira*, "the victorious capital"), the capital of modern Egypt, is situated in lat. 30° 2' n., and long. 31° 16' e., in a sandy plain betwixt the right bank of the Nile and the ridge of Mokattam, and near the point of the delta of the Nile. From the foundation of the city in 969, the Fatimite caliphs of Africa, who brought the bones of their ancestors with them from Kairon, reigned for ten generations over the land of Egypt. The caliph Hakem, who built a mosque near Bab-el-Nassr, and who is the supposed founder of the Druse religion, was the third in the succession. In the year 1171, Saladin usurped the throne from the last of the Fatimites. His descendant, Moosa-el-Ashref, was deposed in his turn in 1250; from that time till the year 1517, when the city was stormed and taken by sultan Selim, C. was governed by a succession of Mameluke kings.

The city of C. occupies about 3 sq. m., and is surrounded by a low wall. Of late years it has been greatly improved. It is lighted with gas, and many fine broad streets have been opened through the crowded districts. The bazaars are well and richly supplied. The houses, which are generally two or three stories high, are all built of variegated brick, with interlinings of wood, and have flat roofs. The city is divided into different quarters, one quarter being appropriated to the Turks, one to the Christians, one to the Jews, etc.; so that every religious sect has its own quarter, which is separated from the adjoining one by strong gates at the end of the streets; these are closed at night, and guarded by a porter, who opens the gate when any one wants to pass.

The most remarkable buildings in the city of C. are its minarets and mosques. The minarets are the most beautiful of any in the Levant, of a prodigious height, and built of alternate layers of red and white stone. The most ancient of all the minarets is that attached to the great mosque of sultan Tayloón. This mosque was built in the year of the Hegira 265 (879 A.D.), before the foundation of the city, and consists of an immense cloister or arcade built on pointed arches, being the earliest extant in that form. Another magnificent mosque is that of the sultan Hassan, situated in the place of the Roumayli, near the citadel, and which was finished about the year 1362 A.D. It has two very elegant and high minarets, and the mosque, in consequence of its size, and the thickness of its walls, was frequently seized and made use of as a fortress by the insurgents in the numerous rebellions and insurrections which were always taking place at C. under the rule of the Mameluke kings. Stains of blood are still to be traced on the marble walls of the courtyard.

The population of C. consists of Turks, Arabs, the former conquerors of the land, who form the bulk of the population, all the petty tradesmen and cultivators of the soil being of Arab origin; Copts, who are descended from the original lords of the land, the ancient Egyptians; Jews, Armenians, Syrians, Africans, and Europeans. Pop. '82, 368,108. The Copts, a mere fraction of the population, completed, in 1867, a fine, lofty, spacious church. Many Europeans and wealthy natives live in the new quarter called

Ismailiyeh. In 1876, C. was connected by rail with Heluan, one of the numerous bathing-places lying to the south.

Of objects worthy of note in the environs of C., there may be mentioned the tombs of the caliphs, situated about a mile beyond the walls, which are magnificent and imposing buildings, forming beautiful specimens of Arabian architecture. There is a museum of Egyptian antiquities at Boolak, and in 1897 the khedive laid the cornerstone of a new museum at C. The public gardens, which consist of groves of orange, citron, palms, and vines, are very beautiful. The trade of C. is rapidly increasing. The exports consist mainly of native products, such as ivory, gum, wood, hides, ostrich feathers, cotton and sugar; while the imports are cotton and woolen goods, prints, hardware, cloth, furniture, shawls, indigo, sheep, tobacco, etc. The manufactures of C. embrace silk and cotton fabrics, gunpowder, glass lamps, sugar, sal ammoniac, weapons, and iron ware. C. is a great seat of learning. The government college and the national schools are largely attended, while several thousand pupils attend the theological university attached to the mosque of Ezher. The schools comprise a commercial and juridical school at the Darb Algamamiz, a school of arts and industry at Boolak (q. v.), and military schools at the Abasseeyah. The language spoken at C. is Arabic, which, though not the purest, is superior in pronunciation to that spoken in Syria. C. is the official residence of the khedive of Egypt, and the residence of a consul-general from Great Britain, France, etc. C. has railway connection with Alexandria and Suez, and there is also a line to upper Egypt. Steamers ply on the Nile as far as the second cataract. Gas, the telephone, and other modern appliances are in use among the European and official circles.

**CAIROLLI, BENEDETTO**, an eminent Italian statesman, born at Gropello, near Pavia, 1826. He was educated at the University of Pavia, which he left in 1848, to become a volunteer against Austria, and from 1851 to 1859 lived in exile in Piedmont, when he again took up arms for Italian liberty, serving at the siege of Palermo, in the Trentino, and at Monterotunda and Mutino. Though previously reputed an uncompromising republican, and renowned for his antagonism to Vatican and church, after 1876, when the *Left* came into power, he was induced, partly through the influence of his friend Depretis, to accept the constitutional monarchy, and after the accession of King Humbert, was appointed premier in the new ministry of March, 1878. When, in October, that ministry resigned, Signor Cairolli was intrusted with the formation of a new cabinet. On the 17th of November, as the king was driving into Naples, a certain Giovanni Passanante attempted to assassinate him with a poniard, but was prevented by Cairolli, who was in the carriage, and who received a severe wound, while King Humbert escaped with a mere scratch. This act of heroism increased the minister's personal popularity, but did not restore the people's confidence in his administration. In the Chamber of Deputies a motion of confidence in the internal policy of the government was lost by 251 votes against 188, and the ministry resigned, December 11th, 1878. The Depretis ministry, which succeeded, was in turn defeated, in 1879, and the *Left* again came into power under Cairolli, who was, however, forced to reconstruct his cabinet the same year, and to bring in Depretis as minister of the interior. Finally, owing to the unpopularity of the policy pursued in regard to the French expedition to Tunis, the ministry resigned in 1881. Since that time, Signor Cairolli was conspicuous as a vigorous leader of the so-called "historic" *Left*. He died in 1889.

**CAISSE**, a coffer, box, case, or chest; in finance, a cash-box, or pay-office, or fund for payments. In anatomy, the drum of the ear. The French call a savings bank, "*caisses d'épargne*."

**CAISSON**, in military matters, is a name sometimes given to a tumbril or ammunition wagon. It is more frequently applied, however, to a large wooden chest or frame, loaded with powder, shells, or both, and buried several feet deep in the ground under some fortification; this destructive combination is to be blown up if there be danger of the enemy approaching and taking possession of that particular part of the defense-work. The French give the name of *caisson pour les étres* to a large chest, carried with the army, and capable of containing 800 rations.

**CAISSON**, in engineering, is a hollow box of iron or wood, open at the bottom, sunk where piers are to be placed. The largest caisson yet sunk was for the tower of the Brooklyn Bridge on the New York side. At the bottom it was 172 ft. long and 102 ft. wide, with an air-chamber 9½ ft. high, the roof 23 ft. thick, and the sides carried up 83 ft. from the lower edge. It had a coffer-dam in the upper part; was built of timber lined with boiler-iron, and bolted together. In its construction there were used of lumber, board measure, 4,200,000 ft., and of iron, including bolts, 620 tons. When completed, it weighed 13,271 tons, and there were 30,000 tons of masonry laid within it. There were two double air-locks extending into the air-chamber, in which were steam-pipes to keep an even temperature. Two shafts passed up through well-holes in the masonry, with an elevator in one, and two spiral stairways in the other. Below the lowest edge of the caisson extended two water-shafts, each 7½ ft. in diameter, in which dredges and scoops grappled the stones and soil, raising their loads to cars above, which conveyed the refuse away. At the same time sand and fine dirt were blown out by air-pressure through 40 or more pipes in various parts of the structure. The interior was illuminated by gas, and constant communication by telegraph was kept up with the

workmen inside. There were four shafts, each 2 ft. in diameter, for the introduction of material for the concrete with which the whole interior was finally filled. The caisson was sunk 78 ft. below mean tide, a work that required a pressure of 34 lbs. per sq. inch, in addition to the normal pressure of air; and to supply this addition, 18 large compressors were used. The earliest caissons for such purposes were used in England in 1738-40 in laying the foundations of the Westminster bridge over the Thames.

**CAITHNESS**, a maritime co., the most northerly on the mainland of Scotland. It is triangular in shape; length, from n. to s., 40 m.; greatest breadth, 30 m.; area, 686 sq. miles. Except in the w. and s., where the mountain-range (composed of granite and gneiss) dividing C. from Sutherland attains, in its highest point, a height of more than 2800 ft., the general aspect of C. is level and bare, being in great part moorland and destitute of trees, while the sea-coast is bold and rocky, with many bays, inlets, promontories, and caves. On the n. coast are Dunnet head and Duncansby head; and on the w. side of the last-named head is a spot of green turf, called John o' Groat's house, where John de Groat or Groat of Warse settled with his brothers in James IV.'s time, and built a house. There are no navigable rivers in C., and no lakes of importance. The climate is damp and chilly, but snow rarely lies on the plains above a day or two at a time. Thunder is rare, but auroræ are seen almost nightly. There are no manufactures, properly so called, although weaving is carried on to some extent. Coal has not been found in C.; the common fuel is peat. The chief crops are oats, bear, turnips, and potatoes. The parts of the surface under tillage are generally a deep fertile loam on a strong till clay. In the n.e., the soil is sandy. The crops are 20 days later in ripening than in the Lothians. The occupants of many of the small farms divide their time between farming and fishing. There are herring, ling, cod, salmon, and lobster fisheries. The herring-fishery in July and August employs about 1500 boats, a part of which come from other parts of the Scotch coasts. Wick is the chief seat of the British herring-fishery. The average number of barrels cured annually in the ports of C. may be stated at 200,000. Pop. '81, 88,865; '91, 87,177

**CAITHNESS FLAGSTONES** are dark-colored bituminous schists, slightly micaceous and calcareous, valuable on account of their great toughness and durability for pavements, cisterns, and various other purposes, and accordingly are largely exported. They belong to the old red sandstone, and contain abundant remains of fossil fishes.

**CAIUS**, Dr. JOHN, the person from whom Caius college, Cambridge, takes its name, was b. at Norwich in 1510. His real name was Kaye or Key, which he Latinized into Caius. He was educated at Gonville hall, university of Cambridge; and at the age of 20, turned into English Chrysostom's *Method of Praying to God*, which was followed by a translation of Erasmus *On True Theology*. He next went abroad, and resided in Italy for several years, studying medicine. On his return to England, he practiced with success at Cambridge, Shrewsbury, and Norwich. Henry VIII. appointed him anatomical lecturer to the company of surgeons in London. In 1547, he was elected a fellow of the college of physicians, of which he was subsequently made president. He also became physician to Edward VI., queen Mary, and queen Elizabeth. In 1557, he obtained permission to elevate Gonville hall into a college, which took the name of Caius college, and of which he became master. This office he held till his death, in July, 1578. His principal work is *A Booke or Counsell against the Disease commonly called the Sweate or Sweatyng Sicknesse*, Anno Do. 1552. C., however, wrote a great number of works on a variety of subjects, critical, antiquarian, and scientific.

**CAIUS COLLEGE**. See GONVILLE AND CAIUS COLLEGE.

**CAIYA'NO**, a t. of southern Italy, in the province of Naples, and 8 m. n. of the city of that name. It was a place of considerable strength in the middle ages, and still retains many remains of its walls and towers, though they have suffered severely in the various revolutions of Naples. Pop. 11,000.

**CAJAMAR'CA**. See CAXAMARCA.

**CAJATAM'BO**, a province in the department of Junin, Peru; 1500 sq.m.; pop. 24,750. The region is mountainous and comparatively barren, with a severe climate. There are many remains of ancient towns, aqueducts, etc. The chief town, of the same name, has a pop. of about 4000, and is in a fertile plain at the foot of the Andes, 140 m. n.n.e. of Lima. The people are employed in spinning wool for sale at Lima.

**CA'JEPUT**, *Melaleuca cajuputi* or *M. minor*, a tree of the natural order *myrtaceæ*, sub-order *leptospermeæ*, from the leaves of which the pungent, aromatic, volatile oil, called *oil of cajuput*, is obtained by distillation. The C. tree is common on the mountains of the Moluccas. It is rather a small tree, with a crooked trunk, thick spongy bark, white wood (whence the name C., properly *kayuputi*, signifying white wood), elliptical-lanceolate alternate leaves, and terminal spikes of white flowers. The greater number of the species are natives of Australia, some of them very beautiful shrubs and frequent ornaments of British hot-houses. Much of the oil of C. of commerce is prepared in the island of Banda. It is said that two sackfuls of leaves yield scarcely three drams of the oil, which is green, transparent, limpid, with a strong penetrating odor, and agreeable only when much diffused.

**CAJ'ETAN**, or **GAIETANI**, BENEDETTO. See BONIFACE VIII.

**CAJETAN, CARDINAL,** 1460-1534, an Italian priest of the Dominican order, whose real name was THOMAS DE VIO, the name Cajetan being assumed by him from his birth-place, Cajeta or Gaëta. He is famous in the history of the reformation as the papal legate commissioned to bring back Luther to allegiance to the church. For this purpose he went to Augsburg in 1518, and Luther was there cited to appear before him. He is reported to have begun by an attempt to intimidate the reformer, but to have ended with an admission of failure, saying that he could not discuss any longer with "that beast; it has two wicked eyes and marvelous thoughts in its head." Luther refused to retract his two propositions; the first, a denial that the treasury of indulgences was filled with the merits of Christ; the second, the view that the receiver of the sacrament must have faith in the grace administered to him. Cajetan's mission thus resulted in widening the breach between Luther and the church. He had been made cardinal in 1517, and in 1523 was sent as papal legate to Hungary. He was employed also on other negotiations. He made a translation of the Old Testament, with a commentary, and wrote a treatise on the authority of the pope, which was answered by the faculty of the University of Paris. He also wrote commentaries upon parts of Aristotle's writings and upon the *Summa* of Aquinas. A collection of his works appeared at Lyons in 1639. See Schillbach, *De vita ac scriptis de Vio Cajetani* (1881).

**CALABAR (OLD)**, a river of Africa which enters the bight of Biafra, about 52 m. w.n.w. of Fernando Po, by an estuary about 9 m. in breadth. It is navigable by steamers for about 200 m. above its mouth, and abounds in crocodiles. The chief towns on its banks are—Duke Town or Old Calabar, situated on its estuary; Creek Town, further up, both seats of British missions; Acoono Coono, and Omun.—**CALABAR (NEW)**, a branch of the Niger, falling into the bight of Biafra, in lat. 4° 30' n., and long. 7° 7' e. It has a bar across its mouth, which prevents the entrance of vessels drawing more than 12 ft., but some miles up it has an average depth of 30 feet.

**CALABAR BEAN**, a very remarkable medicinal agent, which has been introduced into the new edition of the British Pharmacopœia (1867). It is the seed of *physostigma venenosum*, a twining, half-shrubby plant, a native of western Africa, of the natural order *leguminosæ*, sub-order *papilionaceæ*, nearly allied to the kidney bean, but of a genus distinguished by the hood-shaped stigma, and the deeply-furrowed hilum of the seed. The following are the leading characters of the bean itself: "About the size of a very large horse-bean, with a very firm, hard, brittle, shining integument, of a brownish-red, pale chocolate, or ash-gray color. Irregularly kidney-shaped, with two flat sides, and a furrow running longitudinally along its convex margin, ending in an aperture near one end of the seed. Within the shell is a kernel, consisting of two cotyledons, weighing on an average about 46 grains, hard, white, and pulverizable, of a taste like that of the ordinary edible leguminous seeds, without bitterness, acrimony, or aromatic flavor. It yields its virtues to alcohol, and imperfectly to water." It is used in the form of an emulsion by the natives of Africa, as an ordeal when persons are suspected of witchcraft. About twenty years ago, Dr. Christison very nearly fell a victim to his zeal for science in experimenting on some specimens of this bean which had been sent to Edinburgh by some African missionaries, dangerous symptoms having been produced by 12 grains of the kernel which he swallowed. In 1861, Dr. Thomas R. Fraser tried the effects upon himself of doses of 6, 8, and 10 grains. The general symptoms were epigastric uneasiness, great feebleness, dimness of vision, salivation, giddiness, and irregular, feeble, and slow heart's action. About the same time, he made the interesting discovery, that when placed on the eyeball this substance contracts the pupil, and produces near-sightedness; and it is now frequently employed for these purposes by ophthalmic surgeons. In 1864, 50 children were poisoned by eating these beans, which were swept out of a ship at Liverpool. A boy aged six years, who ate six beans, died very speedily. The chief symptoms in these cases were griping, vomiting, and contracted pupils; the face was pale, the eyes bright and protruding, and in trying to walk, the children staggered as if they were drunk. Dr. Fraser, in a paper which he communicated to the royal society of Edinburgh in 1866, maintains that, in mammals, death is generally produced by a combination of syncope (faintness) with asphyxia (suffocation); the symptoms of the one or the other depending on the dose, which, when large, at once destroys the heart's action. It has been used medicinally in small doses (one to ten grains of the powder, or  $\frac{1}{4}$  to  $\frac{1}{2}$  of a grain of the extract) in chorea, tetanus, general paralysis of the insane, and other diseases of the nervous system. Being now a recognized medicinal agent, it is satisfactory to know that the dangerous and even fatal effects of excessive doses may be prevented by administering belladonna, (nightshade), or its active principle, atropia, as a counter-poison. This fact has been established by Dr. Fraser in a communication to the royal society of Edinburgh, embracing the results of 500 experiments on dogs and rabbits. So unmistakable is the power of the antidote, that it can prevent even three times a fatal dose of the kernel from causing death in those animals. Belladonna has also an opposite action on the eye to that of this substance, as it dilates the pupils and produces long-sightedness. When the pupil is contracted by Calabar bean, it may be dilated to its normal, or to a greater, size by belladonna; and when it is dilated by belladonna, it may be reduced to its normal, or to a less, size by Calabar bean.

**CALABASH TREE**, *Oreocentia cufeto*, a tree found in the West Indies and in the

tropical parts of America, of the natural order *bignoniaceæ* (q. v.), suborder *crecentiaceæ*. In height and size it resembles an apple-tree, and has wedge-shaped leaves, large whitish fleshy flowers scattered over the trunk and older branches, and a gourd-like fruit, sometimes a foot in diameter. The wood of the tree is tough and flexible, and is well adapted for coach-making. But the most useful part is the hard shell of the fruit, which, under the name of *calabash*, is much used in place of bottles for holding liquids, and for goblets, cups, water-cans, etc. These shells may even be used as kettles for boiling liquids, and they will bear this several times without being destroyed. They are sometimes highly polished, carved with figures, tinged with various colors, and converted into ornamental vessels. The rinds of gourds are sometimes similarly used, and called calabashes.

**CALABA TREE.** See **CALOPHYLLUM**.

**CALABOZO**, a t. in Venezuela, 120 m. s.s.w. of Caracas, in the plain w. of the river Guarico; pop. 5000. It is an important point for commerce, but is subject to inundations and extremes of heat. The town has a college and a number of schools.

**CALABRIA**, the s. w. peninsula of the kingdom of Italy, bounded n. by the province of Basilicata. Its greatest length, from the southern border of Basilicata to cape Spartivento is about 160 miles. In its northern part it has a breadth in some places of more than 60 m., which suddenly contracts, between the gulfs of Sant' Eufemia and Squillace, to not more than 16. Its entire area is 5819 square miles, and its pop. in 1896 amounted to 1,338,264. It is traversed throughout its entire length by the Apennine mountains (q. v.), whose summits in the region in the n. of C., known as La Silla, and the Aspromonte, in the s., are crowned with pines, while forests of oak and beech cover their sides. The valleys between the various hills afford rich pasture, especially in the n., to which, in spring-time, whole colonies migrate with their flocks and herds. There is no river of any importance in C.; but the valleys and plains, watered by such streams as there are, are very fertile, yielding wheat, rice, cotton, licorice, saffron, the sugar-cane, etc., and also the vine, orange, lemon, olive, fig, and mulberry, in luxuriance. Iron, alabaster, marble, gypsum, and antimony are among its minerals. The fisheries of its coasts, particularly the tunny and anchovy fisheries, are important, and afford employment to a large number of the population. Manufactures are in a backward state. Silk is the staple article. The district is very subject to earthquakes. For purposes of administration, C. is divided into the provinces of Cosenza, which has a population of 469,839—capital, Cosenza; Catanzaro, with a population of 467,136—capital, Catanzaro; and Reggio, with a population of 401,289—capital, Reggio.

In ancient times, the name C. was given to the s.e. peninsula, nearly corresponding to the modern province of Lecce, no portion of which is included in modern C., which answers to the ancient *Bruttium*. The name C., as applied to the district now known by that name, appears to have originated with the Byzantines some time prior to the conquest of the country by the Normans. A colony of the Vauds or Waldenses of Piedmont was founded in C. in 1840, and for some time enjoyed great prosperity, but was extirpated in 1860-61. The destruction of this colony is one of the blackest passages of the history of religion in Italy.

The Calabrians are a proud, fiery, and revengeful race. They were long celebrated as among the fiercest of banditti; but the crimes which in former times made them infamous are no longer frequent. They strenuously resisted the power of France during the Napoleonic campaigns, and were not finally subdued until 1810.

**CALADUM.** See **Cocco**.

**CALAHORRA**, a t. in Spain in the province of Logroño, 24 m. s.e. of the city of that name, is situated on the small river Cidacos, about 2 m. from its confluence with the Ebro. C. occupies the site of the ancient *Calagurris*, celebrated in classic history for the obstinate but unsuccessful resistance it offered (78 B.C.) to Afranius, Pompey's legate, when the citizens slaughtered their wives and children for food rather than surrender. C. was the birthplace of Quintilian the rhetorician. It has an old cathedral and a trade in the agricultural produce of the rich district in which it is situated. Pop. about 8800.

**CALAIS**, a city, port of entry, and co. seat of Washington co., Me.; on St. Croix river at the head of tide water, and opposite to St. Stephen in New Brunswick; the most northeasterly seaport in the United States; and on the St. Croix and Penobscot railroad; 28 miles n. by w. of Eastport. The river is crossed by several bridges, and the New Brunswick and Canada railroad touches at St. Stephen. There is a tide at C. varying from 20 to 30 ft. and steamers of the largest size come and go freely. The St. Croix also furnishes abundant water-power, to which is due the great lumber trade of the city. Shipbuilding is also an extensive business, and there are foundries, machine shops, and dry dock, flour mills, and many other branches of mechanical industry. There are high and grammar schools, public library, electric lights, national and savings banks, a driving park and agricultural association, several hotels, and daily and weekly newspapers. Pop. '90, 7,290. The city was settled in 1779, incorporated as a town in 1809, chartered as a city in 1850, and was nearly destroyed by fire in Aug. 1870.

**CALAIS**, a seaport t. of France, in the department of the Pas-de-Calais, on the strait of Dover, near its narrowest part, the distance from the town of Dover not being more

than 26 miles. There is here a lighthouse 190 ft. high. In 1879 it was determined to encircle C. with vast new fortifications, and make it once more a fortress of the first class. On the s. and e., low marshy grounds, which those in the city have the means of submerging, stretch up almost to the walls. The town, adjacent country, and port, are commanded by the citadel, which is situated at the w. end of the town, while numerous forts, by their cross-fire, defend the weakest points. The harbor, which was formerly shallow, has been greatly improved, and the port is now accessible to the largest vessels. Being one of the chief ports of debarkation for travelers from England to France, it has steam communication with Dover and London. With the former city it is also connected by submarine telegraph, the cable having been laid as early as 1851. The city, which is entered from the sea by a drawbridge and gate, erected in 1685 by cardinal Richelieu, is square in form; its streets are, for the most part, broad and well paved; and its ramparts form pleasant promenades. Among its objects of interest, the most noticeable is the cathedral, with a fine picture of the "Assumption," by Vandyck. It has become a manufacturing town of some importance. The chief manufactures are bobbin-net (tulle), machine-made lace, hosiery, etc. Numerous mills have been built; steam-engines are multiplying; and the inner ramparts have been removed to make room for factories. Hats and gloves are extensively made. It has also distilleries, salt refineries, and ship-building. C. sends many boats to fish for herring and cod on the coasts of Scotland and Iceland. Water, which used to be scarce, is now brought in abundance from the neighborhood of Guines. Its exports consist of eggs, corn, wine, brandy, etc., and it is the entrepôt for the produce of the district. It also does a large business in petroleum. In 1873 a school of artillery was established in C. Pop. '83, 58,965; '91, 56,867; '96, 56,940.

In the 9th c., C. was but a small fishing-village. In the following c., it was much improved by Baldwin IV., count of Flanders, and enlarged and strengthened by Philippe of France, count of Bologne. After a long siege, it was captured by Edward III. of England, whose hard terms, and the self-devotion shown by six of the citizens, who were saved by queen Philippa, form one of the most interesting passages of history. The English retained it until 1558, when it was captured by the duke of Guise, since which time (with the exception of two years, 1596-98, when it was in the possession of the Spaniards) it has remained in their hands. In 1659, Charles II. of England resided some time here; and about a quarter of a century later, James II. arrived here with French troops for the invasion of England, which the destruction of the French fleet prevented him from accomplishing. Louis XVIII. landed here in 1814, after his exile.

**CALAMANDER WOOD**, a cabinet-wood of the greatest value, resembling rose-wood, but much surpassing it in beauty and durability. The tree which produces it is *disopyros hirsuta*, a species of the same genus which produces ebony (q.v.); it has oblong obtuse leaves, which are downy beneath, and flowers without stalks and crowded; and is a native of the s.e. of India, and of Ceylon, particularly of the forests at the base of Adam's Peak. But this tree "has been so prodigally felled, first by the Dutch and afterwards by the English, without any precaution for planting or production, that it has at last become exceedingly rare," so that wood of considerable size is scarcely to be procured at any price. It yields veneers of unusual beauty, "dark wavings and blotches, almost black, being gracefully disposed over a delicate fawn-colored ground." Its density is very great, a cubic foot weighing nearly 60 lbs., and it takes an exquisite polish. The name C. W. is supposed to be a corruption of Coromandel wood.

**CALAMARY**, SQUID, or SLEEVE-FISH, *Loligo*, a genus of cephalopodous mollusks of the order *ibranchiata*, and family *teuthida*. The body is of an elongated form, firm, fleshy, tapering, and flanked towards its posterior extremity by two triangular fins. The body contains a *gladius*, or internal shell, which is horny and flexible, narrow, and pen-shaped, with the shaft produced in front. The mouth is furnished with eight arms. Calamaries have the power of diffusing a dark-colored fluid around them in the water like the cuttle-fish. The different species are distributed over all parts of the world. Several are found in the British seas. In some seas, however, they abound much more, and form a principal part of the food of some of the larger fishes and of whales. The common C. or squid (*L. vulgaris*) is of a bluish color, speckled with purple. It grows to nearly a foot and a half in length, without reckoning the head and arms, which add to the length about half a foot more. See CEPHALOPODA.

**CALAMATTA**, LUIGI, 1802-69; b. in Milan; an engraver who became famous by an engraving of the head of Napoleon taken after his death at St. Helena; and also for an engraving of Ary Scheffer's "Francesca da Rimini." His widow, Josephine, was a painter of religious subjects.

**CALAMBUCO**, a tree found only in the n. part of the island of Luzon, considered superior to teak or live oak for shipbuilding. It is dark and hard, like teak, and is proof against the destructive white ant of the Malay region. Warlike, mechanical, and agricultural tools and implements are made from it. The same name applies to the tree that furnishes the eagle-wood and aloes-wood of commerce, found in Siam and Sumatra. The resin which it yields is supposed to be produced by some disease in the tree, and is used in eastern countries for incense.

**CALAMIANES**, a group of islands in the Eastern archipelago, in lat. about 11° 25' to 12° 20' n., and long. 120° east. Calamianes, the name of the largest of the group, is



about 85 m. long, and 15 m. broad, elevated and fertile, with abundance of animals, such as deer and hogs. The group, with the northern part of Palawan, forms the Spanish province of C.

**CALAMICH'THYS**, a cylindrical and extremely slender ganoid fish in the waters of w. Africa, allied to the polypterus of the Nile.

**CAL'AMINE**, an ore consisting essentially of carbonate of zinc. The name is said to be derived from the Greek and Latin *calamus*, a reed, because when fused it adheres to the base of the furnace in a reed-like form. Its primary form is a rhomboid, and it occurs in small obtuse-edged crystals, also compact and massive. It is white, yellowish, white, brown, green, or gray; is sometimes opaque, sometimes translucent; is brittle, and has an uneven conchoidal fracture. It occurs in beds and veins in rocks of various kinds, but most commonly in limestone. Mendip, Matlock, Alston Moor, Leadhills, and Wanlockhead are British localities. C. is an important ore of zinc. In the duchy of Limburg, in the Netherlands, about 1,500,000 lbs. of it are annually extracted from the mines.

**CAL'AMINT**, *Calamintha*, a genus of plants of the natural order *labiata*, nearly allied to balm (q.v.) (*melissa*). The Common C. (*C. officinalis*, formerly *melissa calamintha*) is not unfrequent in England. It has whorls of flowers (*verticillasters*), on forked many-flowered stalks, and serrated leaves, with an agreeable aromatic odor, not unlike that of some kinds of mint. It is used by the country people to make herb-tea, and as a pectoral medicine.

**CAL'AMIS**; 467-429 B.C.; a sculptor of Greece, who made statues in bronze, ivory, gold, and marble; also famous for his representations of horses.

**CAL'AMITE**, a genus of fossil plants whose true position has not been satisfactorily ascertained. They appear first in the Devonian rocks, and rise through the intermediate formations to the oolitic series, where they are represented by a single species. They reach their culminating point in the coal-measures, where 39 species have been determined. The tall straight stems rose from a swampy clay soil in profusion in the forests of sigillaria, and formed a striking and characteristic feature in the coal flora, though they supplied little material for the structure of coal. They are hollow-jointed cylinders, with longitudinal furrows, giving the fossil the appearance of *equiseta*; from this resemblance, botanists have generally considered them as huge "horsetails." Hooker has been unable to detect any traces of structure, in carefully prepared specimens, or the presence of those siliceous stomata which characterize *equiseta*, and which would have been preserved in the fossil state, and Fleming has shown that the furrows are markings on the interior cavity. While, therefore, it is certain that they are not "horsetails," the absence of fructification makes every attempt to give them their position but guess-work. Hooker supposes them nearly allied to ferns, or club-mosses; Brongniart ranks them among gymnospermous dicotyledons. The upper part of the stem, and the foliage, if any, have not been noticed. The root termination was conical, the joints decreasing downwards in size and length. From the scars on the upper portion of each joint, there proceeded filaments, which were supposed to be leaves, but are really roots. See illus., COAL AND ROCK SALT, vol. IV.

**CAL'AMUS**, the reed pen which the ancients used in writing, was made of the stem of a reed growing in marshy places, probably *arundo donax* (see REED), of which the best were obtained from Egypt. The stem was first softened, then dried, and cut and split with a knife (*scalprum librarium*), as quill pens are made. To this day, the orientals generally write with a reed, which the Arabs also call *kalam*.

**CALAMUS**, a genus of palms. See RATTAN and DRAGON'S BLOOD.

**CALAMUS**, a name sometimes given to the sweet flag (*acorus calamus*). See ACORUS.

**CALAMUS** (Greek), a reed-flute supposed to be similar to the syrinx (q.v.), or Pan-pipes. From *calamus* the *calamautis*, a player of reed-flutes, is derived, and also the words *chalameau* and *shawm*.

**CAL'AMUS AROMATICUS**, the name given by the ancients to a plant to which they ascribed important medicinal virtues. It is by no means ascertained what the plant is: the most probable opinion appears to be that of Dr. Royle, who supposes it to be one of the sweet-scented grasses which yield the grass-oil (q.v.) of India, to which he has given the name of *andropogon calamus aromaticus*. See LEMON-GRASS. The C. A. of the Greeks and Romans came from the east. The *sweet calamus* and *sweet cane* mentioned in Scripture (Exod. xxx. 23, and Jer. vi. 20) are probably the same with the *calamus aromaticus*.

**CALAMY**, EDMUND, an eminent English divine, was b. in London, 1600; studied at Pembroke hall, Cambridge, where he attached himself to the Calvinistic party; and afterwards became domestic chaplain to the bishop of Ely. In 1626, he was appointed lecturer at Bury St. Edmunds, but resigned his office when the order to read the *Book of Sports* began to be enforced. In 1639, he was chosen minister of St. Mary's, Aldermanbury, London. He now entered warmly into the controversies of the time, and became noted as a leading man on the side of the Presbyterians. He had a principal share in the composition of *Smectymnus*, a work intended as a reply to Bishop Hall's

*Divine Right of Episcopacy*, and one of the most able and popular polemics of the day. Like the mass of the Presbyterian clergy, he was monarchical and not republican in his political opinions. He disapproved, therefore, of the execution of Charles, and the protectorate of Cromwell, and did not hesitate to avow his attachment to the royal cause. He was one of the deputies appointed to meet Charles II. in Holland, and congratulate him on his restoration. His services were recognized by the offer of a bishopric, which he refused from conscientious scruples. The increasing tyranny and intolerance of the high church party compelled him give up even his royal chaplaincy. He died Oct. 29, 1686.—Two of his sons were educated for a religious profession: the one, Dr. BENJAMIN C., became a high churchman, and wrote *A Discourse against a Scrupulous Conscience*; the other, EDMUND C., was ejected for non-conformity, and had a son, also named Edmund, who acquired some reputation as the biographer of the ejected clergy.

**CAL'AMY**, EDMUND, D.D., 1671-1782; an English non-conformist clergyman, who arranged for the press *Baxter's Life and Times*, and wrote *Defense of Modern Non-conformity*; *The Non-conformists' Memorial*; and published many sermons.

**CALAND**, or **KALAND**, a brotherhood of Roman Catholics devoted to charitable and devotional works, dating from the 13th c., and of considerable extent in Germany, Switzerland, and France. It degenerated so far that it was suppressed before the reformation, its property being confiscated for public purposes.

**CALAND**, PIETER, b. Holland, 1826; an engineer, and son of an engineer; author of works on encroachments of the sea, and the effect of the sea on rivers; but better known for his improvements in the communication of Rotterdam with the ocean, whereby he replaced a tortuous and difficult route by one easy and direct.

**CALAN'DO**, in music, an Italian expression, meaning diminishing by degrees from forte to piano; it differs from the decrescendo or diminuendo, as the tempo, at the same time, is slightly retarded, but not so much as in ritardando. The proper performance of the C. is purely a matter of good taste and feeling, depending on the performer.

**CALAN'DRA**. See CORN WEEVIL.

**CALANDRONÉ**, a wind-instrument used by the Italian peasants, on which they play simple melodies, and also sometimes accompany their national songs. It has the holes of the common flute, but the intonation is produced as in the common pipe.

**CALA'NUS**, a Hindu philosopher, whose real name, according to Plutarch, was Sphines. He was for some time in the camp of Alexander the Great, but having become seriously ill, he was burned alive at his own request.

**CALAS**, JEAN, a Frenchman, remembered as the unhappy victim of fanaticism and the shocking maladministration of justice, was b. at Lacapardè, in Languedoc, Mar. 19, 1698. He lived as a tradesman in Toulouse, where he had a very good reputation. One evening after supper (Oct. 13, 1761), the eldest son of the C. family, Marc Antoine, a youth addicted to gambling, and subject to fits of deep melancholy, was found hanged in the warehouse. There was not a shadow of a reason for doubting that the unhappy young man had committed suicide; but popular rumor accused the father, or other members of the C. family, of murdering the eldest son, "because he had contemplated conversion to Catholicism." It was also asserted that a young man named Lavaysse, who was in the house on the fatal evening, had been dispatched "by the Protestants of Guyenne to perpetrate the murder." The clergy exerted all their influence to confirm the populace in their delusion. At Toulouse, the White Penitents celebrated with great solemnity the funeral of the young man, and the Dominican monks erected a scaffold and placed upon it a skeleton, holding in one hand a wreath of palms, and in the other an abjuration of Protestantism. The family of C. was, in consequence of the popular excitement, brought to trial for the murder, and several deluded and (most probably) some bribed witnesses appeared against them. A Catholic servant-maid, and the young man Lavaysse, were also implicated in the accusation. C., in his defense, insisted on his uniform kindness to all his children; reminded the court that he had not only allowed another of his sons to become a Catholic, but had also paid an annual sum for his maintenance since his conversion. He also argued from his own infirmity that he could not have prevailed over a strong young man, and referred to the well-known melancholy moods of the deceased as likely to lead to suicide; and, lastly, he pointed out the improbability that the Catholic servant-maid would assist in such a murder. But all his arguments proved unavailing, and the parliament of Toulouse sentenced the wretched man—by a majority of 8 votes against 5—to torture and death on the wheel! With great firmness and protestations of his innocence to the last, the old man died on the wheel, Mar. 9, 1762. His property was confiscated. His youngest son was banished for life from France, but was captured by the monks, and compelled to abjure Protestantism. The daughters were sent to a convent. The young man Lavaysse was acquitted, and the widow of C. escaped into Switzerland, where she was so fortunate as to excite the benevolent interest of Voltaire, who brought the whole affair before the public, and, in his book *Sur la Tolérance*, proved that C. had fallen a victim to religious hatred and popular fanaticism. A revision of the trial followed, and, after

full investigation, the parliament at Paris declared (Mar. 9, 1765) C. and all his family innocent. Louis XV. gave to the bereaved family the sum of 80,000 livres; and the chief magistrate of Toulouse was degraded from his office and fined. See Coquerel, *Jean Calas et sa famille* (1870).

**CALASA'YA BARE.** See CINCHEMA.

**CALASCIBETTA**, or **CALATAS-CIBETTA** (Saracenic = castle of Xibeth, or Scibet), a t. of Sicily, near its center, 54 m. s. e. of Palermo, in the province of Caltanissetta. The town is mean and dismal looking, and is built on a steep and isolated height, the summit of which is 2,570 ft. above the sea, and commands a magnificent view. It was founded in 1080. The only object worthy of notice is the tower of the principal church, which is of early architecture. Pop. about 6,600.

**CALA'SIO**, MARIO DE, 1550-1620; an Italian scholar, doctor of theology and professor of Hebrew in Rome, who made a Hebrew dictionary and grammar. He devoted 40 years of his life to a great work called *Concordantie Sacrorum Bibliorum Hebraice*, which was published after his death, and several times reprinted. It was much praised by Protestants as well as Roman Catholics. The Hebrew words comprised the body of the work, but the Latin version was also given, and in the margin the differences between the Vulgate and Septuagint versions were shown.

**CALASPARA**, a t. of Spain, in the province of Murcia, 40 m. n.w. of the city of that name. The inhabitants, numbering 5,200, are chiefly engaged in agricultural pursuits.

**CALATABELLOTA.** See CALTABELLOTA.

**CALATAFIMI**, a t. of Sicily, in the province of Trapani, situated 8 m. s.w. of Alcamo, in a very fertile district. It is ill-built, and has a ruinous old Saracenic castle, Kalat-al-Fimi, from which it derives its name. There is a remarkable Mosaic altar in the church of Santa Croce. Here, in 1860, Garibaldi's troops defeated the Neapolitan soldiers. Pop. 10,000.

**CALATAGIRONE**, or **CALTAGIRONE**, a city of Sicily, in the province, and 84 m. s.w. of the city, of Catania. It is well built, with wide streets, and has the fame of great wealth. It has manufactures of cotton fabrics and pottery. Pop. about 27,000.

**CALATANAZOR**, a t. of Aragon, Spain, about 10 m. s.w. of Soria. It is celebrated for a great victory over the Christians obtained by Al-Mansur in 1001.

**CALATAYUD**, a city of Aragon, Spain, situated on the Jalon, near its junction with the Jiloca, about 48 m. s.w. of Saragossa. It is built at the base of two rocky ridges, and out of the ruins of ancient *Babilis*, which lay about 2 m. to the east. The city is divided into a new and old portion, the former of which is composed of mean old buildings. The latter has some good streets and handsome squares. C. has a noble old castle, and among its other most noteworthy public edifices are the two collegiate churches and the Dominican convent. In the neighborhood are some curious stalactitical caves. It has manufactures of linen and hempen fabrics, woollens, paper, leather, etc., and a trade in agricultural produce. Pop. 11,055.

**CALATRA'VA**, an order of knighthood in Spain, instituted at Calatrava (q.v.). The statutes of the order, framed by the chapter-general of the Cistercian monks, were sanctioned by the bishop of Toledo in 1164, and afterwards by the pope. At subsequent periods, many privileges were added. After the death of the king, their patron, some of the knights were no longer willing to obey the abbot, and they consequently separated themselves from the monks, and elected a grand-master, Don Garcias de Redon. At a later period, they again united themselves to the Cistercians, after they had gained rich possessions from the Moors both in Spain and Portugal. When Castile had fallen into anarchy, and the other kingdoms were exhausting themselves by internal feuds, the war against the unbelievers was almost entirely carried on by the knights of Calatrava. Their almost uniform success, however, gave rise to rashness; the knights were defeated by emir Jacob ben Yuseff, nearly all of them perished, and Calatrava was occupied by the Moors. After this disaster, the knights transferred their seat to the castle of Salvatierra, by the name of which they passed for a long time afterwards. A truce of 12 years having been concluded, during which the order revived, the knights were able, at the battle of Las Navas de Tolosa, in 1212, again to turn the tide in favor of the Christians. They then returned to Calatrava. Notwithstanding their splendid achievements, the knights of C. never possessed the vast wealth of their brethren of St. James of Compostella (q.v.), a fact which is probably to be accounted for by their having ceded a part of their conquests to the orders of Alcantara and Aviz. But their grand-masters, who were chosen from the highest families in Spain, were very powerful, and exercised a vast influence on public affairs. They did not, however, escape the jealousy of the crown. Two of them were accused of treason, and died on the scaffold; and on the death of the 18th grand-master, in 1489, the administration of the order was transferred to the king by a bull of pope Innocent VIII. By way of compensation for the loss of their independence, the knights were permitted to marry once, though they were still bound to

make vows of poverty, obedience, and conjugal chastity; and latterly to profess belief in the immaculate conception. Their original costume consisted of a coat of white mail, with a white scapulary, a black cap, and a pilgrim's hood; but this dress the anti-pope Benedict XIII., in 1397, granted them permission to exchange for a civil apparel. Their present costume is a white mantle, with a red cross cut out in the form of lilies upon the left breast; while the cross of the order has the same symbol on a silver ground. Two convents for nuns were attached to the order, and were at one time richly endowed. The nuns, attached to the order of C. in 1519, wore the dress of Cistercian nuns, with the cross of the order on the left side of the capoch, fastened to the scapulary.

**CALATRAVA LA VIEJA**, a ruined city of Spain, situated on the Guadiana, about 12 m. n.e. of Ciudad Real. In the middle ages it was a strongly fortified place, but nothing now remains but a single tower. Its defense against the Moors, undertaken by Raymond, abbot of Fitero, and Diego Velasquez in 1153, after it had been abandoned by the Templars, is famous on account of its having originated the order of the knights of Calatrava, long one of the most honorable in Spain. The town was called C. la Vieja, or Old Calatrava, in order to distinguish it from the convent of the knights of the order of Calatrava, erected in the neighborhood in 1214, and which was called Calatrava la Nueva.

**CALAVE'RAS**, a co. in n. California, on the Calaveras, Stanislaus, and Mokelumne rivers, and the Southern Pacific railroad; 980 sq. m.; pop. '90, 8882, including Chinese. Gold and copper mining are the leading occupations, with agriculture. The grove of big trees is in this county. Co. seat, San Andreas.

**CALAVE'RAS**, a river in n. California, running from the Sierra Nevada w. to the San Joaquin, on the border of Sacramento county.

**CALBUR'GA**, a t. of the Nizam's dominions in Hindustan, about 110 m. to the w. of Hyderabad. It stands on a tributary of the Beemah, which is itself a tributary of the Kistna or Krishna. It has been successively the capital of Hindu and Mohammedan sovereignties.

**CALCAIRE GROSSIER** (Fr. "coarse limestone"), the French representative of the Bracklesham eocene beds. It consists of compact limestones, with seams of chert, and intercalated marls and freestones. The fossils are fresh water and marine mollusca; so abundant are they that in one spot near Grignon no less than 400 distinct species have been procured. Associated with the fresh-water remains are the bones of reptiles and mammalia.

**CALCAIRE SILICEUX** (Fr. "siliceous limestone") is the French representative of the Bembridge eocene strata. These compact siliceous limestones extend over a wide area in the Paris basin. The few fossils they contain are fresh water and land shells.

**CALCAREOUS**, in chemistry, is a term applied to substances containing much lime (Lat. *calx*). Thus, *C. waters* are those which hold in solution much carbonate and sulphate of lime, and which are generally known as hard waters, and form a deposit in kettles and other vessels when heated therein. *C. rocks* are those in which lime forms the prevailing element. They may be chemically formed as in the case of tufas, where a saturated solution of carbonate of lime in water is deposited from evaporation or other causes; but they are generally aqueous rocks, the materials of which are supplied by animal remains. Thus, many rocks, like the mountain-limestone, are composed of shells, corals, and encrinurites; while others, like chalk, consist of foraminifera and fragments of other minute testacea. A crystalline structure, varying in degree from the partially crystallized carboniferous limestones to the saccharine statuary marble, is produced in calcareous rocks by metamorphic action. Oolite is a variety of limestone composed of small egg-like grains resembling the roe of fish. The existence of lime in rocks can always be detected by the application of dilute nitric or muriatic acid, when it effervesces from the liberation of the carbonic acid. Pure lime is obtained from calcareous rocks by calcining them—i.e., by driving off the carbonic acid and other volatile matter by heat.—*C. soils* are produced from the disintegration of calcareous rocks. When the rocks are perfectly pure, they generally yield barren soils, as in many chalk and limestone districts of Britain; but when the lime is mixed with clay, so as to form marl, and has a little vegetable matter added, it forms an excellent though rather light soil. Calcareous soils are difficult of drainage, owing to the property that soft lime has of retaining water, although it easily yields it up by evaporation. Such soils are consequently soon dry at the surface after rain, but yet rarely suffer severely from drought.

**CALCAREOUS SPAR**, or CALO-SPAR, the name usually given by mineralogists to carbonate of lime, rhombohedral in its crystallization. It differs from arragonite only in crystallization. See ARRAGONITE. C. S. occurs in all geological formations, and is one of the most abundant of all minerals. It often completely fills cavities in rocks; and although it has been prevented by want of space from assuming a crystalline form is readily divided by the knife and hammer into rhomboids, the primary form of its crystals being a rhomboid, of which the greatest angles are  $105^{\circ} 5'$ . Its secondary forms are more numerous than those of any other mineral. More than 700 have been observed. One of the most common, a rather elongated pyramid, is sometimes called *dog-tooth spar*.

C. S. is colorless and transparent, except in consequence of impurities which may be present in it; and when perfectly transparent, it exhibits in a high degree the property of double refraction of light, which was first discovered in it by Bartholinus. The presence of foreign substances frequently renders C. S. gray, blue, green, yellow, red, brown, or even black.

The name *Iceland spar* has often been given to C. S., at least to the finest colorless and transparent variety, because it is found in Iceland, massive in trap-rock. *Slates spar* is a lamellar variety, often with a shining, pearly luster, and a greasy feel, of which Wicklow in Ireland, and Glen Tilt in Scotland are localities.

**CALCAREOUS SPRINGS**, springs charged with calcareous matter which is deposited in the form of incrustations. Such deposit is called calcareous tufa, and takes the form of other substances inclosed, such as leaves, twigs, and branches of trees. When freshly quarried it is easily shaped, and is therefore convenient for building. The temples of Paestum are of this material, and the stone has acquired great solidity and strength. In central New York such deposits are common, forming the marl below swamps and in the bottoms of ponds. One of these springs at Clermont, France, has formed a deposit of white concretionary limestone 240 ft. long, 16 high, and 12 wide.

**CALCAREOUS TUFFA**, **CALC-TUFF**, or **TUFACEOUS LIMESTONE**, a mineral which in its chemical composition is nearly identical with limestone and marble; but is distinguished by its spongy and cellular structure. It is generally rather soft, brittle, and friable, but sometimes it is sufficiently hard to be used as a building-stone. The *travertino*, used for building at Rome, is a hard calcareous tufa. The color of C. T. is generally yellowish-gray, sometimes yellow or yellowish-brown. It occurs massive, or assumes many uncrystalline forms, as tubular, botryoidal (like clusters of grapes), cellular, etc. Sometimes it incrusts animal and vegetable remains. It is frequent in the neighborhood of calcareous springs. It is sometimes used as a filtering-stone.

**CALCAR**, or **KALCKER**, **JAN VAN**, 1499-1546; a painter, disciple of Titian at Venice, and perfected by studying Raphael; so good an imitator of Titian that his works can scarcely be distinguished from those of that master. One of his pieces is a "Nativity," representing angels around the infant Saviour, so arranged that the light by which they are seen comes wholly from the child.

**CALCASIEU**, a parish in s.w. Louisiana, situated on the Texan border, containing about 3410 sq. m.; pop. '70, 6783-1457 colored; in '90, 20,176. The surface is level in broad savannahs, and the soil very productive in corn, sugar, molasses, and cotton. Judicial seat, Lake Charles.

**CALCASIEU**, a river in Louisiana, about 200 m. long, running into the gulf of Mexico. Near its mouth is a broad expansion called *C. lake*. The river is not navigable.

**CALCED'ONY**. See **CHALCEDONY**.

**CALCEOLARIA** (Lat. *calceolus*, a little shoe), a genus of plants of the natural order *scrophulariaceae* (q.v.), of which there are numerous species, natives of South America, chiefly of that part of the Andes which is more than 9600 ft. above the sea, a few of them reaching almost to the utmost limits of vegetation; although some are found in lower and warmer situations, and some in the southern extremity of the American continent. They abound so much in some parts of Chili and Peru, as to give a peculiar aspect to the landscape. The calyx in this genus is 4-partite; the corolla, 2-lipped; the lower lip remarkably inflated, so as to form a bag; and the shape of the whole in some species considerably resembling that of a slipper. There are only two fertile stamens, and the capsule is semi-bivalvular with bifid valves. Some of the species are shrubby, some herbaceous, almost all the herbaceous species being perennial. Many of them have corymbs of numerous showy flowers. Yellow is the color which chiefly prevails in the flowers of the original species, and next to it purple; but the art of the gardener has succeeded in producing varieties and hybrids which exhibit many other rich and delicate tints. *Calceolarias* have been florists' flowers since about 1890, the curious appearance of the flowers combining with their beauty to render them attractive, and in no genus is the production of hybrids more easily or frequently effected. They are easily propagated by cuttings. Few plants require more liberal supplies of water. They are generally treated in America as half-hardy or as greenhouse plants.—Some of the species are used in South America for dyeing. The roots of *C. arachnoides*, a parent of many of the hybrids in our gardens, are largely employed in Chili, under the name of *reilum*, for dyeing woolen cloths crimson.

**CALCHAS**, a Greek soothsayer in the time of the Trojan war who foretold the length of the siege, and when the fleet was detained at Aulis by adverse winds, demanded the sacrifice of Iphigenia. He is said to have died from vexation on being surpassed in prophecy by another soothsayer called Mopsus.

**CALCINATION**, or **CALCINING** (see **CALX**), is the process of heating or roasting in furnaces or in heaps the various metallic ores. It is resorted to as the first stage in the extraction of the majority of the common metals from their ores, and is essentially a process of oxidation.

**CALCIUM** is the metal present in chalk, stucco, and other compounds of lime. It may be obtained by passing a powerful current of voltaic electricity through fused chloride of C.,  $\text{CaCl}_2$ , when the metal separates in minute globules. It is a yellowish-white metal, can be rolled into sheets, and hammered into leaves, and is intermediate between lead and gold in hardness. It is represented by the symbol Ca, has the atomic weight or equivalent 20 (new system, 40), and has the density 1.578, or nearly half as heavy again as water. At ordinary temperatures, it slowly tarnishes by oxidation; and when placed in contact with water, it rapidly decomposes the water,  $\text{H}_2\text{O}$ , forming lime,  $\text{CaO}$ , whilst hydrogen escapes. To be retained bright, C. must be kept under the surface of naphtha. At a red heat, it melts and burns with a dazzling white light, accompanied by scintillations. See **LIME**.

**CALCRAFT, WILLIAM**, d. 1879; the official executioner or hangman of London; a person of quiet and even gentle manners, who was looked upon by the ignorant as some fearful being quite out of the natural order of humanity. As public executions were stopped in 1860 his fame declined, and little was heard of him except through the exaggerated reports of the ignorant. The price for hanging was fixed at 14s. 6d., of which 7s. 6d. was the fee, 4s. 8d. for stripping the body, and 2s. 6d. for the use of the shell (coffin). C. received that price regularly; he made much more by traveling expenses, perquisites, etc. He died in financially comfortable circumstances. Bull, (prænomèn unknown), the first English hangman whose name survives, lived in the 16th century. The first person hanged in England was Maurice, a nobleman's son. He was executed in 1241, for piracy. Before C., Jack Ketch was the most famous of executioners. He executed, among others, lord William Russell and the duke of Monmouth. C. had retired from office some years before his death on account of advancing age.

**CALC-SINTER**, a mineral, chemically identical with the purest marble and calcareous spar, but peculiarly characterized by its fibrous structure. It is formed from water holding carbonate of lime in solution, and occurs generally incrusting the roofs, walls, and floors of caves, particularly those in limestone rocks; often assuming curious and even fantastic forms. Macalister's cave, in the Isle of Skye, and the limestone caves of Derbyshire, are the most celebrated British localities. But the stalactitic cave of Antiparos, in the Grecian archipelago, is a far more famous locality for this mineral, which is often called *calcareous alabaster*, and used for the same purposes with the true alabaster (q.v.), to which it is in some respects preferable, particularly as not being liable to injury from exposure to the air. Volterra, in Tuscany, is another very famous locality for calc-sinter.

**CALCULATING MACHINE.** The most remarkable application hitherto made of machinery, is perhaps that through which it has been used to relieve the scientific inquirer to a very great extent of the fatigue of manipulating figures, which consumes so much of his time and energies. Various machines have been constructed for this purpose, differing in the extent of their faculties—to use words more suitable to thinking beings than to engines—and somewhat in the principles of their construction. By the *arithmometer*, for instance, a machine invented by M. Thomas of Colmar, all ordinary arithmetical operations are executed without fatigue to the operator; and by a machine contrived by M. M. Scheutz, which rests on the principle of *differences* (q.v.), on the turning of a wheel, the successive terms of any series whose law may be confided to it, are produced—the machine at the same time *printing* a large proportion of its results, and thus providing for the accuracy of its tables. It is a fact of which the English should be proud that an Englishman, Mr. Babbage, is universally acknowledged as the instigating and guiding genius in the progress of these remarkable inventions. Among his inventions was a *difference engine*, of very comprehensive powers, indeed capable of managing series so complex that the differences of its terms do not reach zero until we ascend to the seventh order (*vide* art. DIFFERENCES, CALCULUS OF). An immense range of nautical and astronomical tables lie within the limits just defined; and the machine further tabulates approximately any series whatever that can be treated by the *method of differences*. While engaged in constructing the *difference machine*, Mr. Babbage, probably through his increased experience of the capabilities of machinery, was led to form a new conception—that, namely, of the *analytical machine*. He actually succeeded so far as to devise the means of making his machine perform all the elementary operations of addition, subtraction, multiplication, and division; and it is clear that all changes that can be produced on quantity are merely combinations of these. If, then, he could but have made his machine perform these operations at command, and according to any special order, it could have clearly developed any function whatever whose law is ascertained and fixed. A solution of this difficulty was suggested by the Jacquard loom (q.v.), in which the *cards* oblige a machine capable of working any pattern to work out one particular pattern; and Mr. Babbage having succeeded so far as to form a machine capable of executing any development, expected, by means of *cards of operations*, to compel his C. M. to work according to one fixed law, and no other. Government, however, did not see its way to make the further grants required for this machine, and at Mr. Babbage's death in 1871, nothing further had been done towards its completion. The *difference machine* is now lying, an unfinished curiosity, in the

museum of King's college, London. Both machines will be found described in the third volume of Taylor's *Scientific Memoirs*. The *difference engine*, constructed by Grant for the university of Pennsylvania is very much less expensive than Babbage's, and less complicated than Scheutz's, though provided like it with an apparatus for printing the results.

A simpler form of calculating machine, the well-known cash register, is now in use in a great many stores for the purpose of keeping account of the daily sales and the total amount of money deposited in the cash-drawer during the day. These machines perform only the operation of addition, and in some cases are provided with a printing mechanism which prints the amount registered at any one operation of the machine. The total of the amounts registered at any time is shown on a dial.

Another type of C. M. which has come into considerable use since 1895 is known as the calculagraph and is designed to compute and record elapsed time and also the value of such time in dollars and cents. The machine has an eight day clock, on each side of which is a handle, and beneath the clock dial is a slot into which a card may be inserted. The calculations are printed on this card by means of the two handles. When the right-hand handle is pressed down the time indicated by the clock dial is printed on the card, and if the same card be inserted in the machine at any subsequent time and the left hand handle be pressed down, the machine automatically subtracts the former time from the latter and prints the difference or elapsed time in figures, as hours, minutes and half minutes. The machine in this form is adapted to a large field of usefulness as, for example, where labor is employed and paid by the hour, for recording the time of races, and is in quite extensive use for timing telephone conversations over long-distance lines.

Another refinement has been added to these machines, by means of which it computes the value of the elapsed time in dollars and cents and prints the result. It may be used, for example, to produce vouchers for the pay-roll of workmen who are paid by the hour at some uniform rate per hour. The operation of this machine is to multiply the elapsed time in hours and fractions of an hour by the rate per hour, and to print the result in dollars and cents. A similar instrument is also made which calculates charges of a certain amount for one hour and a less amount for succeeding hours; as 50 cents for the first hour and 25 cents for each succeeding hour. Any number of separate calculations can be made without reference to the order in which they are commenced.

**CALCULUS**, or **STONE** (in medicine), a hard concretion formed within the animal body, in consequence of the deposition in the solid form of matters which usually remain in solution. See **CONCRETION**. The concretions most commonly termed calculi are those formed in the kidneys or bladder (*urinary C.*); and those formed in the gall-bladder or biliary ducts (*biliary C.*). Both of these give rise to very painful symptoms, and may even threaten life.

*Biliary C.*, or *gall-stone*, may generally be presumed to exist when excessively severe pain suddenly arises in the right side beneath the border of the ribs, and when in a few hours jaundice comes on, showing that some obstruction has existed to the outward flow of the bile. But the absolute proof that these symptoms depend on C. is often wanting. The pain is fortunately transitory, but is more severe while it lasts than almost any other known form of suffering, unless it be that of a C. in the kidney and ureter. It may be relieved by large doses of opium, but the remedy requires to be cautiously given, as even in medical hands fatal accidents have occurred. Gall-stones, when impacted in the ducts, sometimes have proved fatal; but much more frequently they find their way, sooner or later, into the intestines. They are almost invariably composed of cholesterine (q.v.), with coloring matter and mucus, arranged in layers in a semi-crystalline disposition.

*Urinary C.* is a disease of all ages, but most common in advanced life and in the male sex. It is also very frequent in gouty persons, or among those who pursue sedentary occupations and live freely. It is rare among those who live much in the open air, or who take much violent exercise, and use little animal food and wine. Among sailors, it is peculiarly rare. In certain parts of the country, the disease is said to be frequent, as in Norfolk, and perhaps along the e. coast of Scotland. In India, too, where some of the predisposing circumstances mentioned above can hardly be said to prevail, stone is by no means uncommon. It would appear, therefore, that the predisposing causes of C. are still very imperfectly understood. In its early stages, the disease usually presents itself in the form of *gravel*, shown by the passage of numerous very small portions of gritty concretions, which may be observed in the urine as a deposit like sand, or like small grains of Cayenne pepper. When such deposits occur frequently, especially if they are present at the time of passing the urine, and not merely after it has cooled, there is reason to apprehend the formation of calculus. If, in these circumstances, there are pains of a dull character in the loins, with occasional twinges of sharper suffering, no time should be lost in seeking medical advice. If a fit of very severe pain should occur in a person for some time affected with gravel, if the urine be bloody, if agonizing twinges, commencing in the loins, sting downwards into the thigh or the groin, it is probable that a stone has already formed in the kidney, and is being displaced towards the bladder. C. in the bladder is at first attended with little suffering, as compared with that caused by the stone in its passage downwards from the

kidney; but unless removed or evacuated, the C. is sure to enlarge, and it then becomes the cause of one of the most painful diseases that afflict humanity. The existence of a stone in the bladder, however, should never be taken for granted without a surgical examination, as all the symptoms are deceptive in certain cases. The most striking, and perhaps the most trustworthy evidence of stone in the bladder, apart from the use of the sound (see LITHOTOMY), is smarting and burning pain experienced after the bladder has been emptied, together with occasional temporary stoppage in the flow of urine. The correct appreciation of all the symptoms, however, demands considerable familiarity with such cases.

The discovery of the tendency to urinary C. at an early period of its growth, has been greatly aided by the use of the microscope and of chemical tests. Generally speaking, it may be said that whenever the urine, after standing for a few hours, can be observed to contain more sediment than a very slight cloudiness towards the bottom of the vessel, there is room for careful inquiry into the existence of some derangement of the health. But all sediments are not equally apt to determine C., nor is the treatment of the different kinds of sediment at all similar; care should therefore be taken to determine, from time to time, whether the character of the sediment may have undergone a change, so that the treatment may be adapted accordingly.

The chief varieties of urinary C. are—1. Uric acid (red sand); 2. Urates of ammonia, soda, lime, etc. (brick-dust sediment); 3. Phosphates of ammonia and magnesia, lime, etc.; 4. Oxalate of lime; 5. Carbonate of lime (chiefly in domestic animals); 6. Cystine; 7. Xanthic oxide (a very rare form, discovered by Dr. Marcet). Calculi are frequently found to be composed of numerous successive layers, having a perfectly distinct chemical composition. Urates and phosphates in particular frequently succeed each other, and form what is called an alternating calculus.

When C. has once fairly formed in the urinary passages, it seems probable that no absolute cure exists except the removal of it, if possible, from the body (see LITHOTOMY and LITHOTRITY); but in the stage of gravel, and still more in the earlier stages detected by careful examination of the urine, much may be done to check the tendency to this distressing and dangerous malady. The chief remedies consist in careful regulation of the diet and mode of living, together with the use of solvents adapted to the particular form of deposit found to be habitually present. See URINE.

**CALCULUS, THE INFINITESIMAL**, otherwise sometimes called the transcendental analysis, is a branch of mathematical science which commands, by one general method, the most difficult problems in geometry and physics. The merit of the invention of this powerful mathematical instrument has been claimed for Leibnitz, but is undoubtedly due with equal justice to Newton, who laid the foundations for it in that celebrated section of his *Principia*, in which he demonstrates the chief theorems regarding the ultimate values or limits of the ratios of variable quantities. The view of one class of writers is, that these distinguished men invented the C. simultaneously and independently; and it is the fact that Leibnitz's system is unfolded from premises differing somewhat from those of Newton. See FLUXIONS. Another class of writers hold that Newton is the real inventor, and that to Leibnitz no more can be conceded than that he was the first who, using the suggestions of Newton's genius, gave a systematic statement to the principle of the transcendental analysis, and invented its appropriate symbolic language. He had the doctrine of limits before him when he wrote, and did little more than unfold more fully the logic of the processes therein suggested, and exhibit them in algebraical forms.

The infinitesimal C., both in its pure and applied forms, whether of geometry or mechanics, is a branch of the science of number; its symbols are of the same kind, are operated on according to the same laws, and lead to analogous results. It differs from the other branches of the science of number, such as arithmetic and algebra, in regarding number as continuous—i.e., as being capable of gradual growth and of infinitesimal increase, whereas they deal with finite and discontinuous numbers. It differs from ordinary algebra in another respect. In the latter, the values of unknown quantities, and their relations with each other, are detected by aid of equations established between these quantities *directly*; in the C., on the other hand, the equations between the quantities are not directly established, but are obtained by means of other equations primarily established, not between them, but certain derivatives from them, or elements of them. This artifice is most fertile, for it can be shown that in the great majority of cases the relations of quantities concerned in any problem may more easily be inferred from equations between these their derivatives or elements than between themselves.

It will be seen that the C. created a new notion of number—as continuous or growing. It is now necessary, in order to a proper conception of it, that a precise idea should be formed of a *differential*. The simplest idea of a differential is unquestionably that got by considering number as made up of infinitesimal elements, and a differential or "infinitesimal" as being the value of the difference between a number at one stage of its growth and as another *very* near it. Every finite number being—in the view of the C. as first conceived by Leibnitz—composed of an infinite number of these infinitesimal elements, certain axioms at once present themselves regarding infinitesimals; as, for instance, "that a finite number of them has no value at



all when added to a finite quantity." Many other such axioms readily follow, from which, on this view, the whole theory of the infinitesimal C. may be constructed. But there are logical objections to this mode of forming the theory of the transcendental analysis, and of three views that have been propounded, that now universally accepted as the most logical, and as being capable of the easiest application, is that founded on the method of limits, already referred to as the invention of Newton. The meaning of a differential on this view will now be explained.

It is clear that the C. can be applied only where numbers may have the continuous character—i.e., where they are or may be conceived as being variable. If two unknown quantities are connected by a single equation only, we clearly have the condition satisfied, as where  $y$  and  $x$  are connected by the equation

$$(1) \quad y = F(x),$$

where  $F$  is a sign denoting some function of  $x$ , as  $\tan. x$ ,  $\cos. x$ ,  $x^2$ , etc. This equality may be satisfied by innumerable values of  $y$  and  $x$ . One question which the C. solves is, how does  $y$  vary when  $x$  varies? To solve it, and, at the same time, show how the doctrine of limits affects the definition of a differential, suppose  $x$ ,  $y$ , and  $x + Dx$ ,  $y + Dy$ , to be two pairs of values of the variables which satisfy the above equation; then

$$(2) \quad y = F(x), \quad \text{and} \quad (3) \quad y + Dy = F(x + Dx).$$

From (2) and (3) we have, by subtraction,

$$(4) \quad Dy = F(x + Dx) - F(x);$$

whence we have the ratio

$$\frac{Dy}{Dx} = \frac{F(x + Dx) - F(x)}{Dx}.$$

This ratio will generally change in value as  $Dx$  and  $Dy$  diminish, till, as they both vanish, which they must do simultaneously, it assumes the form  $\frac{0}{0}$ . Taking this form,

it ceases to have a determinate actual value, and it is necessary to resort to the method of limits, to ascertain the value to which it was approaching, as  $Dx$  and  $Dy$  approached zero. Let, then,  $dx$  and  $dy$  be any quantities whose ratio is equal to the limiting ratio of the increments  $Dx$ ,  $Dy$ , so that

$$\frac{dy}{dx} = \lim \frac{Dy}{Dx}$$

as  $Dx$  and  $Dy$  approach zero. Then  $dx$  and  $dy$  are the differentials of  $x$  and  $y$ . It may be observed that where  $x$  and  $y$  are connected as above, they cannot vary independently of one another. In the case assumed,  $x$  has been taken as what is called the *independent* variable, the question being, how does  $y$  vary when  $x$  varies. If  $y$  were made the independent variable, it would be necessary to solve the equation  $y = F(x)$ , if possible, so as to express  $x$  in terms of  $y$ . The result would be an equation  $x = \phi(y)$ . This being obtained, we should find  $\frac{dx}{dy} = \lim \frac{Dx}{Dy}$  as before. It will be seen that on this view differentials are defined merely by their ratio to one another. Their actual magnitude is perfectly arbitrary. This, however, does not render an equation involving differentials indeterminate, since their relative magnitude is definite, and since, from the nature of the definition, a differential cannot appear on one side of an equation without another connected with it appearing on the other.

The idea of a differential being once comprehended, the reader will be able to understand, in a general way, the main divisions of the C., which we shall now briefly delineate. So much is clear from what has been stated, that there must be two main divisions—one by which, the primary quantities being known, we may determine their differentials; and another by which, knowing the differentials, we may detect the primary quantities. These divisions constitute the differential C. and integral C. respectively.

1. THE DIFFERENTIAL CALCULUS.—Recurring to the formula already given we know

$$\frac{dy}{dx} = \lim \frac{Dy}{Dx} = \lim \frac{F(x + Dx) - F(x)}{Dx}.$$

It is clear that, in the general case,  $\frac{F(x + Dx) - F(x)}{Dx}$  at the limit will still be some

function of  $x$ . Calling it  $F'(x)$ , we have generally  $\frac{dy}{dx} = F'(x)$ .  $F'(x)$  is called the first differential coefficient of  $y$  or  $F(x)$ . Being a function of  $x$ , it may be again differentiated. The result is written

$$\frac{d^2y}{dx^2} = F''(x),$$

$F''(x)$  being the second differential coefficient of  $y$  or  $F(x)$ ; and again  $F''(x)$  may be a function of  $x$ , and so capable of differentiation. Now it is the object of the differential

C. to show how to obtain the various differentials of those few simple functions of quantity which are recognized in analysis, whether they are presented singly or in any form of combination. Such functions are the sum, difference, product, and quotient of variables, and their powers and roots; exponentials, logarithms; and direct and inverse circular functions. The C. so far is complete as we can differentiate any of those functions or any combination of them—whether the functions be explicit or implicit; and with equal ease we may differentiate them a second or any number of times. This C. is capable of many interesting applications as to problems of maxima and minima, the tracing of curves, etc., which cannot here be particularly noticed.

2. THE INTEGRAL CALCULUS deals with the inverse of the former problem. The former was: Given  $F(x)$ , to find  $F'(x)$ ,  $F''(x)$ , and so on. The present is in the simplest case—viz., that of an explicit function: Given  $\frac{dy}{dx} = F'(x)$ , to find  $F(x)$ . The methods

of the integral C., instead of being general, are little better than artifices suited to particular cases; no popular view can be given of these. In many cases, integration is quite impossible. The explanation of *integration by parts*, by *approximation*, *definite integrals*, and *singular solutions*, is far beyond the scope of the present work. The reader is referred to any of the numerous text-books on the subject. The integral C. has applications in almost every branch of mathematical and physical science. It is specially of use in determining the lengths of curved lines, the areas of curved surfaces, and the solid contents of regular solids of whatever form. The whole of the lunar and planetary theories may be described as an application of the integral C., especially of that branch of it which deals with the integration of differential equations. It is applied, too, in hydrostatics and hydrodynamics, and in the sciences of light, sound, and heat. In short, it is an instrument without which most of the leading triumphs in physical science could never have been achieved.

CALCULUS OF VARIATIONS.—The foundation of this C. is a method of differentiation, but of quite a peculiar kind. As above explained, the object of the differential C. is to determine the form which a function, such as  $F(x)$ , will assume if  $x$  receive an indefinitely small increment, such as  $Dx$ . In the C. of variations, the object is to ascertain and lay down the laws of the changes supervening on a slight alteration of the *form of the function*, or should  $F(x)$  become  $F'x$ . This C. commands with ease a class of problems called problems of isoperimeters, which were formerly insoluble. It has also power over mechanical problems, and many departments of high physics cannot be touched without its aid. Mr. Airy and Prof. Jellet have both written works on the subject, which may be consulted.

CALCULUS OF FINITE DIFFERENCES, CALCULUS OF FUNCTIONS.—For brief notices of these growths from the original transcendental analysis, see the articles under the headings DIFFERENCE and FUNCTIONS.

CALCUTTA (*Kali Ghatta*, the ghaut or landing-place of the goddess Kali), the capital of the province of Bengal, and metropolis of British India, is situated on the left bank of the river Hoogly, an arm of the Ganges, in  $22^{\circ} 35'$  n. lat., and  $88^{\circ} 27'$  e. long., about 100 m. from the sea by the river. C. was founded by governor Charnock in the year 1686, by the removal hither of the factories of the East India company. In 1700, three villages surrounding the factories having been conferred upon the company by the emperor of Delhi, in recognition of a present made to Azim, a son of Aurungzebe, they were forthwith fortified, and received the name of fort William, in honor of the reigning king; but the place was subsequently termed Calcutta, the name of one of the villages. In 1707, C. had acquired some importance as a town, and was made the seat of a presidency. In 1756, however, a great misfortune befell the rising town: it was unexpectedly attacked by Surajah Dowlah, the nawaub of Bengal, and being abandoned by a number of those whose duty it was to defend the place, it was compelled to yield after undergoing a two days' siege. Only 146 men, however, fell into the enemy's hands; but these were treated with heartless cruelty. Cast at night into a confined cell, about 20 ft. square—the notorious "Black Hole" (q.v.)—they endured the most unheard-of sufferings, and in the morning it was found that only 23 out of 146 had survived the horrors of that night. The city remained in the hands of the enemy until eight months afterwards, when Clive arrived in the country from England. In conjunction with admiral Watson, Clive succeeded in recapturing the town, and afterwards concluded a peace with the nawaub. Soon after this, and subsequent to the important victory of Plassey, the possessions of the East India company were greatly extended by means of grants made by the emperor of Delhi, and C. once more resumed its career of progress, and advanced rapidly in prosperity. In 1852, C. was erected into a municipality, the proprietors paying assessments, and erecting commissioners to apply the proceeds of these assessments in cleansing, improving, and embellishing the town. In 1837, the population of the town proper amounted to 229,700; it had increased by 1881 to 447,601; in 1891 it was 861,764, with suburbs (excluding Howrah, which had 116,006). Besides these, thousands of the three and a half millions who sleep at night in the surrounding districts of Hoogly and the 24 pergunnahs, flock during the day to C., on foot, by boat, or by railway, to their daily toll. The inhabitants are mostly Hindus; but the Mohammedans, in 1891, were nearly half as numerous as the Hindus. In 1891 the Christians numbered only about

29,000. There is a considerable number of Europeans and of Eurasians (having white fathers and native mothers), with some Armenians, Greeks, Jews, Parsees, and negroes. The port extends for about 10 m. along the river, and is somewhat less than 2 m. in breadth at its broadest part, the area being about 8 sq. m., and comprised for the most part between the river and the circular road, a spacious roadway which marks the landward boundary of the city proper. Beyond this road there lie extensive suburbs, the chief of which are Chitpore on the n., Nunden Baugh, Bahar-Simleah, Sealdah, Entally, and Ballygunge on the e., and Bhowanepore, Alipore, and Kidderpore on the south. The villages of Sulkeah, Howra, and Seebpore are situated on the opposite side of the river, and contain the salt-golahs or warehouses of the government, extensive manufactories, dockyards, and ship-building establishments. The appearance of the city as it is approached by the river is very striking; on the left are the botanical gardens, destroyed by the cyclones of 1867 and 1870, but since replanted, and the bishop's college, a handsome Gothic edifice, erected by the society for the propagation of the gospel in foreign parts; on the right is the suburb of Garden Reach, with its handsome country-seats and beautiful gardens; further on are the government dockyards and the arsenal; beyond these is the Maidan esplanade, which has been termed the Hyde park of India, being the favorite place of resort of the *élites* of C. for their evening drive. Here, near the river, lies fort William, the largest fortress in India, having been constructed at a cost of £2,000,000, and occupying, with the outworks, an area of about half a mile in diameter. It is garrisoned by European and native soldiers, mounts 619 guns, and its armory contains 80,000 stands of small-arms. Facing the esplanade, among other fine buildings, is the government house, a magnificent palace erected by the marquis of Wellesley. Beyond this, extending northwards along the river bank, is the Strand, 2 m. in length, and 40 ft. above low water, with various ghauts or landing-places. It is adorned by many fine buildings, including the custom-house, the new mint, and other government offices, and the appearance given by these and other edifices has gained for C. the appellation of "city of palaces." Among its other places of interest, mention may be made of the Sudder Dewanee Adawlut, the principal court of justice; the town-hall, a fine building; the Bengal club, writers' buildings, bank of Bengal, Jesuits' college, medical college, university, the Indian and the Economic museums, theatre, besides various churches, mosques, Hindu temples, and pagodas and numerous bazars. There are a number of monuments throughout the city, the most noticeable being those erected to the marquis of Wellesley and sir David Ochterlony. Although the European quarter of the town is distinguished for its fine public buildings and commodious dwelling-houses, the quarters occupied by the natives present a very different appearance, their houses being in most instances built of mud, or bamboo and mats, and the streets narrow and unpaved. Considerable improvements have, however, been effected of late; new and wider streets have been opened through crowded quarters; brick houses are fast replacing the huts, and an extensive system of drainage has been carried out, to the no small advantage of the inhabitants. The cyclone of Nov., 1867, destroyed 30,000 native houses, and that of June, 1870, was likewise very destructive.

The water supply of C. has been very much improved. Formerly the water was kept in large tanks, interspersed throughout the city, whence it was borne by water-carriers or *bahisties* in large leather bags. Since the year 1866, however, a supply of excellent water has been obtained from the Hoogly, about 15 m. above C., where it is filtered and sent down by pipes in the usual way. The result of this and of a system of underground drainage with an outlet in the Salt Lake, has been a marked improvement in the health of the city. Gas and electric lights have now taken the place of the oil-lamps which were formerly in general use for lighting the streets at night. Street cars have been introduced and many miles of line are in use. A canal girds a part of the city beyond the circular road.

The communications of C. afford great facilities for its extensive commerce. There are several lines of railway connecting it directly with Khulna in the delta; with Goalanda, an important centre of steamship traffic on the Brahmaputra; with Darjiling in the Himalayas, and with the two seaports, Port Diamond and Port Canning. The lines to northwest India and to Bombay start from Howrah. C. is also connected by electric telegraph with the principal towns of India, and can communicate with England by several lines. Uninterrupted communication is kept up with Great Britain by numerous and well-appointed steamers and sailing-vessels. This intercourse has been greatly facilitated by the opening of the Suez canal. The river adjacent to the city varies in breadth from a quarter of a mile to nearly a mile. There are dry docks and wet docks. The city has water communication in three directions: to the east by various rivers leading to the Brahmaputra; to the north by the Hoogly and the Nadiya rivers leading to the Ganges, but navigation is here confined to the broad boats drawing from two to three feet of water; to the west by the Midnapur canal. The port has excellent anchorage, and is the lowest of several seaports on the Hoogly, which is navigable by seagoing vessels.

The growth of scientific and literary societies, here and elsewhere in India among the native communities, indicates a degree of progress and intellectual activity very hopeful for the future of India. The principal of these in C. are the Bengal Asiatic society, founded in 1784 by sir W. Jones, possessing a fine library, and a valuable and extensive museum; the Bethune society, for the promotion of intercourse between European and native gentlemen; the Dalhousie institute, for the literary and social improve-

ment of all classes of the community; the Bengal social science association, and others. The university of C. was founded in 1857, on the same basis as the London university, and exercises functions over Bengal, the North-west Provinces, Oude, and the Central Provinces. Colleges have been instituted to prepare intending students. In 1896, 2298 candidates for admission to the university of C. passed the required examinations. Other educational institutions are numerous in C. There is an engineering college and four government colleges. The principal places for religious instruction are Bishop's college, intended chiefly for the education of missionaries and teachers, and the institutions of the established and free churches of Scotland for the same purpose, all which are ably conducted.

C. may be regarded as the great commercial center of Asia. One third of the whole trade of India is done here. The exports are jute, opium, cotton, rice, sugar, indigo, coffee, tea, saltpetre, linseed, shellac, buffalo horns, hides, castor-oil, cutch, gunny bags, etc. As a central depot for the richest parts of India, C. has an extensive inland trade. The principal industries are sugar-refining, cotton manufacturing, flour, saw, and oil mills, and shipbuilding docks. Several newspapers are published. There are a few banks and numerous insurance and other companies, with a chamber of commerce. Living is comparatively cheap, and most of the luxuries of life, as well as its necessities, are to be had in the unpretentious shops of C. as readily as in most European towns. The annual fall of rain averages 64 in.; the temperature in the shade ranges in July from 78° to 87°, and in Dec. from 60° to 79°.

C. is the headquarters of the governor-general of India, and the seat of the government, the supreme courts of justice, and of the court of appeal for the province of Bengal.

**CALDANI, LEOPOLDO MARCO ANTONIO**, 1726-1818; an anatomist and physician, b. at Bologna, assistant to Morgagni, the celebrated anatomist of Padua, after whose death C. was chosen his successor in the professorship. At the age of 76 he published a valuable series of anatomical plates. He published also *Elements of Pathology and Physiology*.

**CALDAS**, or **CALDETAS** (Lat. *calidus*, hot), the Spanish for warm springs (*aquas*, waters, being understood), which are very abundant in the Peninsula, where a great number of places have received their names from the presence of these mineral waters; such as C. de Malavella, C. de Estrac, and C. de Mombuy, in Catalonia; C. de Reyes, C. de Cuntis, and C. de Tuy, in Galicia; C. de Taipas, C. de Faveiros, C. de Rainhas, in Portugal. The name is common in the topography of South America, as well.

**CALDECOTT, RANDOLPH**, English artist, was born at Chester in 1846 and died at St. Augustine, Fla., where he had gone for his health, in 1886. He was self-taught, and while a bank-clerk contributed sketches to the London illustrated papers, which were so highly praised that he removed from Manchester to the metropolis to make art his sole calling. In depicting country life, and animals, he rivaled Leech in humor and draughtsmanship. Among books illustrated by him were *Caldecott's Picture-books*; Washington Irving's *Old Christmas* (1875) and *Bracebridge Hall* (1877); and Mrs. Ewing's *Daddy Darwin's Dovecote* and *Jackanapes* (1884). See Blackburn's *Randolph Caldecott: a Personal Memoir*, etc. (1886).

**CALDER, Sir ROBERT**, 1745-1818; a Scotch baron of an ancient family, second son of sir Thomas Calder of Muirton. He served long and honorably in the British navy, and as captain of the fleet took part in the battle off Cape St. Vincent in 1797, for which he received a baronetcy and the thanks of parliament. He was rear-admiral in active service during the expected invasion of England by Napoleon, received both praise and blame, and was tried by court-martial. He was acquitted of disaffection and cowardice, but reprimanded for not having done more to renew an indecisive engagement. Three years before he died he was restored to command.

**CALDERON, DON PEDRO**, whose full name was **DON PEDRO CALDERON DE LA BARCA HENAO Y RIAÑO**, was b. in Madrid, 1600, and educated in the Jesuits' college there. Afterwards, at Salamanca, he studied chiefly history, philosophy, and law. His poetical genius was precocious. Before he was 14 years old, he had written a drama, *El Carro del Cielo* (The Celestial Chariot). In early life he gained, by his poetry, and also by his fertile invention of decorations, etc., for festive occasions, the patronage of several distinguished persons, and, on leaving Salamanca, 1619, was well received by the courtiers at Madrid. Love of military adventure induced him to enter the army, 1626; and, after serving with distinction in Milan and the Netherlands, he was recalled to the court of Philip IV., a prince fond of theatrical amusements, by whom he was employed to superintend various court amusements, and especially to invent dramas for the royal theater. In the following year C. was made knight of the order of San Jago, and took part in the campaign in Catalonia. Peace brought him back to poetry. The king gave him a pension, contrived to let him cultivate uninterruptedly his fertile dramatic genius, and spared no cost in securing for his plays a splendid initiation on the stage. In 1661, C. received from the head of the order of San Jago permission to enter the church, and, in 1663, was appointed to the chaplaincy of the archiepiscopal church of Toledo; but, as this post removed him too far from the court, he was appointed chaplain in the royal chapel at Madrid, 1668, and received, with other favors, a pension charged on the revenue of Sicily. In the same year he was appointed a priest in the brotherhood of San Pedro, and shortly before his death, was elected by his brethren as their *caplan mayor*.

He died May 25, 1681, leaving his considerable property to the fraternity of San Pedro, by whom a splendid monument to his memory was raised in the church of San Salvador at Madrid. Fame and pecuniary prosperity had accompanied his career. The chief cities of Spain—such as Toledo, Seville, and Granada—had paid him, from time to time, large sums of money for writing their *Autos Sacramentales*, or *Corpus Christi* pieces. In these compositions, C. excelled all his predecessors, and esteemed them more highly than all his other works, though in many respects the latter display the author's genius quite as remarkably.

Spain numbers C. among its greatest poets, and criticism must allow that many of the defects in his works are to be ascribed to circumstances, and the times in which he lived, rather than to the native tendencies of his genius. He is characterized by brilliancy of fancy, elegance of versification, and a richness of detail, which from its very abundance often becomes tedious. His collected dramatic works—including many pieces of intrigue, heroic comedies, and historical plays, of which some deserve the title of tragedy—amount to 128. Among his romantic tragedies, the *Constant Prince* (*El Principe Constante*) holds the first rank. Besides these, he wrote 95 *Autos Sacramentales*; 200 *Loas* (preludes); and 100 *Saynetes* (divertissements). His last play, *Hado y Divisa*, was written in his 80th year. His shorter poems have perished; but his dramas have held their place on the stage better than those of Lope de Vega himself. The most complete edition of his dramas appeared at Madrid (9 vols., 1688–89); another was published by Apuntes (10 vols., Madrid, 1760–68). Goethe and Schlegel have made him popular in Germany, but in Britain he is not well known, and in France not cared for.

**CALDERON**, DON SERAFIN ESTEBANEZ, a Spanish poet and novelist, was b. at Malaga in 1801, studied law at the university of Granada, and in 1822 became professor of poetry and rhetoric there. A volume of poems which he published shortly after procured for him some distinction. Subsequently, he became an advocate in his native city, but still continued faithful to the muses. In 1830 he went to Madrid, where he published anonymously his *Poesías del Solitario* (1833). He also wrote several articles on Andalusian manners for the *Cartas Españolas*, the only literary journal at that period in Spain. In 1836, he was appointed civil governor of Logroño, but an accident obliged him to return to Madrid, where he devoted himself to collecting MSS. of the old national literature, to be the basis of a great critical edition of the *Cancioneros* and *Romanceros*. C. wrote likewise a fine novel, *Christianos y Moriscos*. To the literature of the Spanish Moors he paid great attention. His *Escenas Andaluces* (1847) are a series of lively sketches of Andalusian life. At his death in Feb., 1887, he left behind him a work on the *Expediciones y Aventuras de los Españoles en Africa*. The Spanish government purchased his very valuable library.

**CALDERWOOD**, DAVID, an eminent Scottish divine and ecclesiastical historian, descended of a good family, was b. in 1575, and about 1604 was settled as Presbyterian minister of Crailing, Roxburghshire. Opposed to the designs of James VI. for the establishment of Episcopacy in Scotland, on that monarch's visit to his native country in 1617, he and other ministers signed a protest against a bill, then before the Scots parliament, for granting the power of framing new laws for the church to an ecclesiastical council appointed by the king, and in consequence he was summoned before the high commission of St. Andrews. Refusing to submit, he was committed to prison for contumacy, and then banished the kingdom. He retired to Holland, and in 1623 published there his celebrated controversial work, entitled *Altare Damascenum*, etc., in which he rigorously examined the origin and authority of Episcopacy. In 1622, a pretended recantation of his protest was published at London by a venal writer, Patrick Scott. While on the continent, C. was known by the quaint appellation of Edwardus Didoclavius, being an anagram on his name Latinized. After king James's death in 1625, he returned to Scotland, and for some years was engaged collecting all the memorials relating to the ecclesiastical affairs of Scotland, from the beginning of the reformation there to the death of James VI. In 1638, he became minister of Pencaitland, near Edinburgh; and in 1643 was appointed one of the committee for drawing up the *Directory for Public Worship in Scotland*. He died at Jedburgh in 1650. From the original MS. of his *History of the Kirk of Scotland*, preserved in the British museum, an edition was printed for the Wodrow society, in 8 vols., 8vo (Edin. 1842–45), edited by the Rev. Thomas Thomson.

**CALDIERO** (ancient *Caldarium*), a decayed town of n. Italy, about nine m. e. of Verona. Its thermal springs were in repute as early as the 1st c. of the Christian era, and continued to enjoy popularity until the commencement of the 16th c., after which they gradually became neglected, and are now little visited. The Austrians repulsed the French here in 1796.

**CALDWELL**, a co. in w. Kentucky; 315 sq.m.; pop. '90, 18,186, inclu. colored; generally level, and good pasture land. Iron and coal are found. Chief productions, corn, tobacco, wool, etc. The Illinois Central and the Ohio Valley railroads traverse the county. Co. seat, Princeton.

**CALDWELL**, a parish in Louisiana, on the Washita river; 548 sq. m.; pop. '90, 5814, inclu. colored. Surface hilly, producing corn, cotton, etc. Chief town, Columbia.

**CALDWELL**, a co. in n.w. Missouri, on the Hamilton and Kingston railroad; 430 sq.m.; pop. '70, 11,390—284 colored; in '90, 15,152. Products, corn, wheat, oats, butter, wool, etc. Surface level, and soil rich. Co. seat, Kingston.

**CALDWELL**, a co. in n.w. North Carolina, on Catawba river and the Chester and Lenoir railroad; 460 sq. m.; pop. '90, 12,298, includ. colored. Surface rough and partly mountainous, including a portion of the Blue Ridge. Productions, corn, wheat, oats, and tobacco. Co. seat, Lenoir.

**CALDWELL**, a co. in s.e. Texas, e. of the San Marcos river; 500 sq.m.; pop. '70, 6572—2531 colored; in '90, 15,769. Main business agriculture and stock-raising; an undulating surface, well wooded and fertile. Co. seat, Lockhart, near which are about 20 springs of some celebrity.

**CALDWELL, CHARLES**, 1772-1853; a native of N. C., celebrated as a physician, and writer on medical subjects. He published Blumenbach's *Elements of Physiology* translated from the Latin, edited the *Port Folio*, edited Cullen's *Præcise of Physic*, published the *Life and Campaigns of General Greene*; was professor of medicine in Transylvania university; made a tour in Europe; established medical institutions in Louisville; wrote *Memoirs of the Rev. Dr. Horace Holley*, and left his own memoirs ready for publication after his death. See his *Autobiography* (Philadelphia, 1855).

**CALDWELL, CHARLES HENRY BROMEDGE**, 1823-77; b. Hingham, Mass.; naval officer; entered the U. S. navy, 1838; defeated a tribe of Fiji island cannibals, 1858; took part in the bombardment of Forts Jackson and St. Philip, 1862; commanded the mortar flotilla in the operations at Port Hudson, 1863; became chief of staff of the North Atlantic squadron, 1870; promoted commander, 1874.

**CALDWELL, JAMES**, 1734-81; a native of Va.; graduated at the college of New Jersey; became pastor of the Presbyterian church in Elizabethtown. He was a zealous patriot during the revolution, and became obnoxious to the Tories of the region, who, in 1780, burned his house and church. Soon afterwards a British force from Staten Island fell upon the village of Connecticut Farms, where C.'s wife and children were temporarily resident, and the wife was killed by a shot while praying with her children. It is of C. that the story is told of his distributing hymn-books to the soldiers short of wadding, with the exhortation "Now, boys, put Watts into them." C. was shot and killed by a patriot sentinel at Elizabethtown Point during a dispute about a package that the soldier declared it his duty to examine. The soldier was tried by the civil authorities for murder, convicted, and executed. A fine monument to "The Soldier Parson" was dedicated at Elizabethtown on the 64th anniversary of his death.

**CALDWELL, JOSEPH, D.D.**; 1773-1835; a native of N. C.; graduated at the college of New Jersey, and a tutor there from 1791-96; then chosen professor of mathematics in the North Carolina university, and in 1804 was made president and professor of moral philosophy. He wrote a *Treatise on Geometry* and letters on internal improvements.

**CALDWELL, MERRITT**, 1806-48; b. Hebron, Me.; graduated at Bowdoin college, 1828; professor of mathematics and vice-president of Dickinson college, 1834-7, and of metaphysics and English literature from 1837 till his death; author of *Manual of Elocution* (1846), *Philosophy of Christian Perfection* (1847), etc.

**CALDWELL, SAMUEL LUNT**, D.D., b. Mass., 1820; graduated at Waterville coll. (now Colby univ.) and at Newton theol. sem.; pastor of a Baptist church at Bangor, Me., and at Providence, R. I.; held a professorship in the Newton seminary; and in 1878 was elected to succeed John H. Raymond, LL.D., as pres. of Vassar coll., resigning 1886. He d. in 1899.

**CALEDONIA**, a kind of poetical name applied to Scotland, being a resumption of that given by the Romans to the country n. of the wall of Antoninus, which ran between the firths of Forth and Clyde. Among the chief tribes of this region were the Caledonii, whence the whole country has been called Caledonia. Tacitus speaks of the Caledonians as having red hair, large limbs; being naked and barefooted; living in tents, without cities; supporting themselves by pasturing cattle, by the chase, and by certain ferries; addicted to predatory warfare; and fighting in chariots with shields, short spears, and daggers. They are supposed to have been of Gaelic or Celtic origin, and to have painted their bodies, whence the name Picti or Picts, by which, according to many writers, they were afterwards known. Agricola was the first Roman gen. to come in contact with the Caledonians. In 84 A.D. he defeated them, now united to repel a common enemy, under their chief Galgacus, at the Mons Graupius (or Graupius), the site of which has not been determined. The Romans overran the n.e. of Scotland as far as the Moray firth, and formed many encampments (of which remains still exist), but they never reduced the country to a Roman province. Roman coins and military relics have been found in connection with these camps. The name of Caledonii disappears about the beginning of the 4th c., when the inhabitants of Scotland begin to be spoken of as Scots and Picts (q.v.). See SCOTLAND.

**CALEDONIA**, a co. in n.e. Vermont, on the New Hampshire border, intersected by the Boston and Maine and the St. Johnsbury and Lake Champlain railroads; 648 sq.m.; pop. '90, 23,486. It is in an agricultural region, with abundant water-power, and has quarries of granite and limestone, and sulphur springs. Co. seat, St. Johnsbury.

**CALEDONIAN CANAL**, a chain of natural lakes united by artificial canals, running across the n. of Scotland in a straight line from n.e. to s.w., from the North sea

to the Atlantic, through Glenmore, or the Great Glen of Albin, in Inverness-shire, and touching Argyleshire at the s. end. The sea and fresh water lochs in this line are Beauly, Ness, Oich, Lochy, Eil, and Linnhe. The canal was formed to avoid the dangerous and tedious navigation of ships, especially coasting vessels, round by the Pentland firth, cape Wrath, and the Hebrides; the distance between Kinnaid's head and the sound of Mull by this route being 500 m., but by the canal only 250, with an average saving of  $9\frac{1}{4}$  days for sailing vessels. The C. C. begins in the Beauly firth, near Inverness, whence a cut of 7 m. joins loch Ness, which is 24 by  $1\frac{1}{2}$  mile. A cut of 6 m. joins loch Ness and loch Oich, which is  $8\frac{1}{2}$  by  $\frac{1}{2}$  mile. Another cut of 2 m. joins loch Oich and loch Lochy, which is 10 by 1 m.; and a fourth cut of 8 m. joins loch Eil at the village of Corpach, 2 m. n. of fort William. This ship communication is 604 m. long,  $87\frac{1}{2}$  m. being through natural lochs or lakes, and 23 m. by artificial cuts. Each cut is 120 ft. broad at surface, and 50 at bottom, and 17 deep. The highest part is loch Oich, which is 94 ft. above the sea. There are in all 28 locks, each 170 to 180 ft. long, and 40 wide, with a rise or lift of water of 8 feet. Eight of the locks, called Neptune's staircase, occur in succession near the w. end of the canal. Some large mountain streams between lochs Eil and Lochy are conducted in huge culverts under the canal; and by a new cut, the Lochy water is turned into the Spean. The practicability of this great work was first shown by a survey under government in 1778 by the celebrated James Watt; but it was not till 1803 that it was begun under Mr. Telford. The whole line was opened for ships in 1823. After three years of repair, it was reopened in 1847. Ships of 500 to 600 tons, fully laden, can pass through the canal.

**CALEDONIA (NEW).** See **NEW CALEDONIA**.

**CALEDONIA SPRINGS**, in Prescott co., province of Ontario, 40 m. from Montreal. They are strongly alkaline, with additions of bromine and iodine, and are much frequented by persons afflicted with scrofulous, cutaneous, and rheumatic disease.

**CALF, or CALFE, ROBERT**, b. about 1678; d. 1719; a Boston clothier, who at the age of 23 (1700) pub. in London *More Wonders of the Invisible World*, a slanderous compilation, aimed chiefly at Cotton Mather's work of similar title. He was himself a believer in witchcraft, and is said to have been unscrupulous. The book was publicly burned at Cambridge by order of Increase Mather, and C. was prosecuted by Cotton Mather.

**CAL'EMBOURG, or CAL'EMBOUR**, the French name for a pun (q. v.).

**CALENDAR** (from Calends, q. v.), the mode of adjusting the months and other divisions of the civil year to the natural or solar year. The necessity of some division and measurement of time must have been early felt. The phases or changes of the moon supplied a natural and very obvious mode of dividing and reckoning time, and hence the division into months (q. v.—see also **WEEK**) of 29 or 30 days was, perhaps, the earliest and most universal. But it would soon be observed that, for many purposes, the changes of the seasons were more serviceable as marks of division; and thus arose the division into years (q. v.), determined by the motions of the sun. It was soon, however, discovered that the year, or larger division, did not contain an exact number of the smaller divisions or months, and that an accommodation was necessary; and various not very dissimilar expedients were employed for correcting the error that arose. The ancient Egyptians had a year determined by the changes of the seasons, without reference to the changes of the moon, and containing 365 days, divided into twelve months of 30 days each, with five supplementary days at the end of the year. The Jewish year consisted, in the earliest periods, as it still does, of twelve lunar months, a thirteenth being from time to time introduced, to accommodate it to the sun and seasons; this was also the case with the ancient Syrians, Macedonians, etc. The Jewish months have alternately 29 and 30 days; and in a cycle of 19 years there are seven years having the intercalary month, some of these years having also one, and some two days more than others have, so that the length of the year varies from 353 to 385 days.—The Greeks, in the most ancient periods, reckoned according to real lunar months, twelve making a year; and about 594 B.C., Solon introduced in Athens the mode of reckoning alternately 30 and 29 days to the month, accommodating this civil year of 354 days to the solar year, by occasional introduction of an intercalary month. A change was afterwards made, by which three times in eight years a month of 30 days was intercalated, making the average length of the year  $365\frac{1}{4}$  days. See **METRONIC CYCLE**.

The Romans are said to have had originally a year of 10 months; but in the times of their kings, they adopted a lunar year of 355 days, divided into 12 months, with an occasional intercalary month. Through the ignorance of the priests, who had the charge of this matter, the utmost confusion gradually arose, which Julius Cæsar remedied, 46 B.C., by the introduction of the **JULIAN CALENDAR**, according to which the year has ordinarily 365 days, and every fourth year is a leap-year of 366 days—the length of the year being thus assumed as  $365\frac{1}{4}$  days, while it is in reality 365 days, 5 hours, 48 minutes, and 50 seconds; or 11 minutes, 10 seconds less. Cæsar gave to the months the number of days which they still have.

So comparatively perfect was the Julian style of reckoning time, that it prevailed generally among Christian nations, and remained undisturbed till the renewed accumulation of the remaining error of eleven minutes or so had amounted, in 1582 years after the birth of Christ, to ten complete days; the vernal equinox falling on the 11th instead of the 21st of Mar., as it did at the time of the council of Nice, 325 years after the birth of Christ. This shifting of days had caused great disturbances, by unfixing the times of the celebration of Easter, and hence of all the other movable feasts. And accordingly, pope Gregory XIII., after deep study and calculation, ordained that ten days should be deducted from the year 1582, by calling what, according to the old calendar, would have been reckoned the 5th of Oct., the 15th of Oct., 1582; and, in order that the displacement might not recur, it was further ordained that every hundredth year (1800, 1900, 2100, etc.) should not be counted a leap-year, excepting every fourth hundredth, beginning with 2000. In this way the difference between the civil and natural year will not amount to a day in 5000 years. In Spain, Portugal, and part of Italy, the pope was exactly obeyed. In France, the change took place in the same year, by calling the 10th the 20th of Dec. In the Low Countries, the change was from the 15th Dec. to the 25th; but it was resisted by the Protestant part of the community till the year 1700. The Catholic nations, in general, adopted the *style* ordained by their sovereign pontiff; but the Protestants were then too much inflamed against Catholicism in all its relations, to receive even a purely scientific improvement from such hands. The Lutherans of Germany, Switzerland, and, as already mentioned, of the Low Countries, at length gave way in 1700, when it had become necessary to omit *eleven* instead of ten days. A bill to this effect had been brought before the parliament of England in 1585, but does not appear to have gone beyond a second reading in the house of lords. It was not till 1751, and after great inconvenience had been experienced for nearly two centuries, from the difference of the reckoning, that an act was passed (24 Geo. II., 1751) for equalizing the style in Great Britain and Ireland with that used in other countries of Europe. It was then enacted that eleven days should be omitted after the 2d of Sept., 1752, so that the ensuing day should be the 14th. A similar change was about the same time made in Sweden and Tuscany; and Russia is now the only country which adheres to the *old style*; an adherence which renders it necessary, when a letter is thence addressed to a person in another country, that the date should be given thus:—April  $\frac{1}{13}$  or  $\frac{1}{13}$  <sup>June 27</sup> <sub>July 9</sub>; for it will be observed, the year 1800, not being considered by us as a leap year, has interjected another (or twelfth) day between old and new style. See CHRONOLOGY: DATE.

The C. of the French republic remains to be noticed, which was adopted in consequence of a decree of the national convention in 1793. The midnight preceding the autumnal equinox of 1792 was fixed upon as the new epoch, from which the years were to be reckoned as the year 1, the year 2, etc. The year was divided into 12 months, each of 30 days, to which new names were given, as *Vendémiaire* (vintage month), *Brumaire* (foggy month), etc.; and instead of weeks, each month was divided into periods of 10 days, called *Primidi*, *Duodi*, *Tridi*, etc. Five *complementary* days were added at the end of each year, which were the *Fête du Génie*, *Fête du Travail*, etc. By Napoleon's command, this new system was abolished, and the use of the Gregorian C. resumed on Jan. 1, 1806.

**CALENDAR, FRENCH REVOLUTIONARY.** The French nation, in 1792, while reforming so many other of the world's customs, undertook the task of making a new calendar, professedly upon philosophical principles. The new era began with the republic at midnight of Sept. 21, 1792, and the months, seasons, and festivals were arranged as follows:

## AUTUMN.

Vendémiaire.....	Vintage month.....	22 Sept. to 21 Oct.
Brumaire.....	Fog month.....	22 Oct. to 20 Nov.
Frimaire.....	Sleet month.....	21 Nov. to 20 Dec.

## WINTER.

Nivose.....	Snow month.....	21 Dec. to 19 Jan.
Pluviose.....	Rain month.....	20 Jan. to 18 Feb.
Ventose.....	Wind month.....	19 Feb. to 20 Mar.

## SPRING.

Germinal.....	Sprout month.....	21 Mar. to 19 April
Floréal.....	Flower month.....	20 April to 16 May.
Prairial.....	Pasture month.....	20 May to 18 June.

## SUMMER.

Messidor.....	Harvest month.....	19 June to 18 July.
Fervidor, or Thermidor.....	Hot month.....	19 July to 17 Aug.
Fructidor.....	Fruit month.....	18 Aug. to 16 Sept.



## SANS-CULLOTIDES, OR FEASTS DEDICATED TO.

Les Vertus...	The Virtues.....	17 Sept.
Le Génie.....	Genius.....	18 Sept.
Le Travail.....	Labor.....	19 Sept.
L'Opinion.....	Opinion.....	20 Sept.
Les Récompenses.....	Rewards.....	21 Sept.

This calendar existed until the 10th Nivose, year of the republic XIV. (Dec. 31, 1805) when the old system was restored by Napoleon.

**CALENDAR.** The name given to a member of one of the numerous sects of dervishes in Mohammedan countries, and said to be derived from the name of the founder of the sect. It is familiar to readers of the *Arabian Nights*.

**CALENDAR OF PRISONERS,** in the practice of the criminal law in England, is the technical name given to the list of all prisoners' names in the custody of the sheriff of each county, prepared for the assizes. When the business is over, and the trials concluded, the clerk of assize makes out in writing four lists of all the prisoners, with separate columns, containing their crimes, verdicts, and sentences, leaving a blank column, in which, if the judge has reason to vary the course of the law, he writes opposite the names of the capital convicts—to be *reprieved, respited, transported*, etc. These four calendars, being first carefully compared together by the judge and the clerk of assize, are signed by them, and one is given to the sheriff, one to the jailer, and the judge and the clerk of assize respectively keep another. If the sheriff receives afterwards no special order from the judge, he executes the judgment of the law in the usual manner, agreeably to the directions of his calendar.

**CALENDERING** is the term applied to the process of finishing by pressure the surface of linen, cotton, and other textile fabrics, as well as paper. It is usually done by passing the fabric between cylinders pressed together with great force; hence the origin of the term, which is a corruption of *cylindering*.

The familiar domestic processes of starching and ironing afford the simplest illustrations of the object and result of calendering. The domestic mangle effects the same object as the flat iron, and is a near approach in construction to the C. engines of the manufacturer, no traversing-box of stones being used in the new patent mangles.

The cylindrical C. machine is said to have been introduced into this country by the Huguenots, driven here by persecution. The cylinders were originally of wood, but the liability to warping is a strong objection to them.

The modern calender consists of from 8 to 12 (commonly 6) cylinders or "bowls," set vertically in a strong iron frame, with driving gear, and furnished with weights suspended over a pulley to produce the required pressure. This sometimes amounts to, or even exceeds, 20 tons, including the weight of the rollers. In a 5-roller machine, the arrangement is this: The center roller is of iron or copper, made hollow for the admission of steam or a red-hot heater, the one immediately above and that directly below it are of paper; and the remaining two, one at the top and the other at the bottom, are of cast-iron. At least one of the rollers is always of paper, as it has more elasticity than metal, and is not liable to warp, like wood. It consists of sheets of brown paper or pasteboard, densely packed and compressed on an iron axis. The edges of these form the surface of the roller, which is turned and polished, an operation of some difficulty.

Before the final rolling in the C. machine, the fabric is first lightly smoothed by passing over warm cylinders. Cotton goods are starched with a starch prepared from flour, and the starch is sometimes thickened with plaster of Paris, porcelain clay, or a mixture of these, to give a fictitious appearance of stoutness, which of course vanishes when the article is washed. For ordinary C. the fabric is then simply passed between plain cylinders, which produces the desired effect by flattening the otherwise round threads. When, by means of a hot cylinder, with a pattern raised upon it, the amount of this flattening is unequal on different parts of the cloth, the beautiful effect known as "watering" is the result. *Glazing* is produced by combined rubbing and pressure; the rollers, one of which is heated, being made to move with different velocities, so that one side of the fabric is rubbed as well as pressed by the roller whose surface moves with the greater rapidity. Before the invention of these rubbing cylinders, glazing was effected by rubbing the surface of the fabric with a polished flint. In Dundee, where half a century ago it was not the custom to calender the linen at all, there are now more than 1000 hands employed in this branch of industry. Calenders are used at most paper-mills for putting a smooth finish or, it may be, a high glaze upon paper. Machines similar to the one above described, but with all the rollers of iron, and also called calenders, are used for rolling india-rubber into sheets for coats, shoes, etc.

**CAL/ENDS.** The Romans made a threefold division of the month into *calends*, *nones*, and *ides*. The C. always fell upon the 1st of the month; the *nones* in Mar., May, July, and Oct., on the 7th; and the *ides* on the 15th; and in the remaining months, the *nones* on the 5th, and *ides* on the 13th. The C. were so named because it was an old custom of the college of priests on the first of the month to *call* (or assemble) the

people together to inform them of the festivals and sacred days to be observed during the month; the nones received their name from being the *ninth* day before the *ides*, reckoned inclusively; and the *ides* from an obsolete verb, signifying to divide, because they nearly halved the month. This threefold division also determined the reckoning of the days, which were not distinguished by the ordinal numbers first, second, third, etc., but as follows: Those between the C. and the nones were termed *the days before the nones*; those between the nones and the *ides*, *the days before the ides*; and the remainder, *the days before the C.* of the next month. Thus, the *ides* of Jan. happening on the 18th of that month, the next day would not be termed by a Latin writer the 14th, but *the 19th before the C. of Feb.*, reckoning inclusively, i.e., reckoning both the 14th of Jan. and the 1st of Feb., and so on to the last, which was termed *pridie calendæ*.

*Ad calendæ Græcæ*, a Roman proverbial saying, practically equivalent to "never." The Roman C. were often appointed as days for payment of rent, interest, etc.; but as the Greeks had no C., a postponement of payment *ad calendæ Græcæ*, simply meant a refusal to pay altogether. It is said that the emperor Augustus frequently used the phrase, which afterwards became a proverb. See **CALENDAR**.

**CALÉNTURE**, a Spanish term (*calentura*) applied to a species of temporary delirium or fever occurring on board ship in hot climates, and probably due to the effect of exposure to the direct rays of the sun. The descriptions of the disease seem rather fanciful and contradictory, and the term is nearly obsolete. See *Dictionnaire des Sciences Médicales*.

**CALEPINO**, AMBROGIO, 1485-1511, an Augustine monk who devoted his life to making a polyglot dictionary. The latest edition comprises 11 languages, some of them added by Passerat and others.

**CALGARY**, a city in the province of Alberta, Canada, and the centre of a large stock-raising region, on the Canadian Pacific railroad, 2264 miles w. of Montreal and 838 miles w. of Winnipeg. It was incorporated in 1885, having been a Hudson's Bay post, prior to the construction of the Canadian Pacific railroad. It lies on a beautiful plateau, backed on three sides by mountains, and is nearly surrounded by Bow and Elbow rivers. It is an important distributing point for freight; ships large quantities of cattle, sheep, and horses, and has a large trade in furs and hides. There are four churches, three banks, good hotels and schools, some costly public and private buildings, waterworks, electric lights, etc. Population, 1891, 8510.

**CALHOUN**, a co. in n. e. Alabama, on Coosa river and the Southern and the Eastern and Western railroads; 640 sq. m.; pop. '90, 33,825, includ. colored. Surface uneven and in some parts mountainous. Productions agricultural. Marble, limestone, lead, and iron abound, and some gold has been discovered. Co. seat, Jacksonville.

**CALHOUN**, a co. in s. Arkansas, on the Washita and Moreau rivers; 575 sq.m.; pop. '90, 7267, includ. colored. Surface rolling or level, and soil good; productions agricultural. Co. seat, Hampton.

**CALHOUN**, a co. in w. Florida, on the gulf of Mexico, w. of Appalachicola river; 1080 sq.m.; pop. '90, 1681, includ. colored. Surface level and fertile, producing corn, tobacco, etc. Co. seat, Blountstown.

**CALHOUN**, a co. in s.w. Georgia; 265 sq.m.; pop. '90, 8488, includ. colored. It is level, with fertile soil, but little cultivated. Co. seat, Morgan.

**CALHOUN**, a co. in s.w. Illinois, between the Illinois and Mississippi rivers; 260 sq.m.; pop. '90, 7652. Near the rivers the land is low and subject to inundation; in other parts marked by high bluffs and tablelands. Productions agricultural. There are coal-fields in the w. section. Co. seat, Hardin.

**CALHOUN**, a co. in w. Iowa, on Coon river and the Des Moines, Northern, and Western railroad; 576 sq.m.; pop. '70, 1802; in '90, 13,107. Productions agricultural. Co. seat, Rockwell City.

**CALHOUN**, a co. in s.w. Michigan, on St. Joseph river and the Cincinnati, Jackson, and Mackinaw, and the Michigan Central railroads; 720 sq.m.; pop. '90, 43,501. Soil rich, surface generally level; productions agricultural. Co. seat, Marshall.

**CALHOUN**, a co. in n. Mississippi, on the Yallahusha river; 600 sq.m.; pop. '90, 14,688, includ. colored. Productions, corn, cotton, butter, etc. Co. seat, Pittsboro.

**CALHOUN**, a co. in s.e. Texas, on the Gulf of Mexico, and including Matagorda Island; 500 sq.m.; pop. '90, 815, includ. colored. Surface level and soil poor, with little timber. The Southern Pacific railroad and its branches traverse the county. Co. seat, Port Lavaca.

**CALHOUN**, a co. in w. West Virginia, on the Little Kanawha river; 280 sq.m.; pop. '70, 2939; in '90, 8155. An agricultural region. Co. seat, Grantsville.

**CALHOUN**, JOHN CALDWELL, an American statesman, and seventh vice-president of the United States, descended from a Presbyterian emigrant from Ireland to Pennsylvania in 1783, was the third son of Patrick and Martha (Caldwell) Calhoun, and was born in the Abbeville district (now county) South Carolina, March 18, 1782. His early education was irregular and defective, owing chiefly to the moderate circumstances of the family, and though determined to obtain a collegiate education, he worked on the

farm until he was nineteen; then began to study under a brother-in-law, and, in 1802, entered the junior class at Yale, graduating in 1804 with high honors. After studying law, part of the time at Litchfield, Conn., he returned to his native state, where he practised without distinguishing himself; but in 1811 was elected to congress by the party favoring a war with Great Britain, and in that same year married a second cousin, Floride Calhoun, who brought him a moderate fortune, and inherited from her mother the estate of Fort Hill, now in Pickens co., which was his home after 1824. On entering Congress he was placed on the committee of foreign affairs, and supported President Madison in his recommendation, April, 1, 1812, of an embargo as preliminary to a declaration of war, and in May presented a report to the House advising an appeal to arms, following it up with a bill making a formal declaration of war. Although he supported the administration during the conflict, he warmly opposed the non-importation act, and in 1816 advised the increase of the navy, and the building of permanent roads as the best means of uniting and defending the country. In the same year, as chairman of the committee on national currency, he reported a bill for the incorporation of a national bank, and on April 6 made a vigorous speech in behalf of a protective tariff as calculated "to bind together more closely our widely-spread republic." In March, 1817, he was made secretary of war in the cabinet of President Monroe, and having previously maintained that congress could make internal improvements in the various states without express constitutional authority, he was, in 1818, requested by the House of Representatives to prepare a plan for opening and constructing roads and canals. He reorganized the war department, reduced the army, and attempted to bring General Jackson to trial for invading Florida in violation of his orders. In 1820 he supported the Missouri Compromise bill. In 1821 he was mentioned as a candidate for the presidency, but General Jackson proved more popular, and Calhoun was elected vice-president in 1824, receiving the votes of the friends of Jackson and of Adams. Joining the party in opposition to President Adams and in favor of General Jackson, he was re-elected vice-president in 1828, and as the southern states at that time were almost unanimous for free trade, he became the leader of the party advocating that measure, while Mr.—afterwards President—Van Buren headed the middle state party desirous of a protective tariff. The passage of a tariff bill in 1828 led Calhoun to prepare a paper which asserted the doctrine of the sovereignty of the states and which was issued by the legislature of South Carolina; becoming known as the "South Carolina Exposition." The lack of harmony between Calhoun and Jackson was increased when the latter learned, or thought he had learned that Calhoun had arrayed the cabinet against him during the Seminole war, and also by a little social controversy in which Calhoun supported and Jackson and Van Buren opposed an attempt on the part of ladies high in Washington society to ostracize the wife of the secretary of war. (See EATON, MARGARET L.) In 1831 the *Globe* newspaper was established in Washington to counteract the influence of the *Telegraph*, a paper devoted to Calhoun's interests, and it being evident that Jackson favored Van Buren as his successor, and that the repeal of the protective system could not be obtained through the former, Calhoun published, July 26, 1831, an address in a South Carolina newspaper in which he repeated his arguments in favor of free trade, and asserted the right of states to judge of infractions of the constitution and to nullify such laws. In 1832, Aug. 28, he addressed a letter to the governor of South Carolina in which he maintained that "there is no direct and immediate connection between the individual citizens of a state and the general government," and that "the great conservative principle" of the union is nullification. On Nov. 24, South Carolina adopted an ordinance to nullify the tariff, and Calhoun at once resigned the vice-presidency and entered the senate. He opposed the president's proclamation urging the people of South Carolina to reconsider their position, and his attempt to obtain additional legislation to enable him to enforce the collection of revenue. Clay's compromise measure of 1833, looking to the abandonment of the protective policy after 1843, was supported by him; he acted with Clay and Webster in denouncing General Jackson for removing the public deposits from the United States bank; but although co-operating with the Whigs for several years, he refused to be classed with them. Foreseeing clearly a conflict between the North and South on the slavery question, he strove in every way to arrest the anti-slavery movement. After the financial crisis of 1837, President Van Buren proposed to place the public moneys in the custody of officers especially appointed for the purpose, and the exclusive use of coin by the government. By siding with him on this question, Calhoun alienated his friends among the Whigs, and was bitterly reproached as a deserter by Clay and Webster. He supported Van Buren for re-election, and induced South Carolina to vote for him; defended President Tyler's veto of the bills for chartering a United States bank, denounced the tariff bill of 1842, and voted for the Webster-Ashburton treaty with England. He had now become allied with the democratic party, but on the expiration of his term of service, in 1843, he declined a re-election. In March, 1844, he was appointed secretary of state by President Tyler, but in 1845 was re-elected to the Senate. He was largely instrumental in securing the annexation of Texas, but in 1846 opposed the war with Mexico. In 1847 he proposed a convention of southern states to prevent northern ships and commerce from entering their ports, as a retaliation for the toleration in northern states of anti-slavery presses and societies; in 1848 denied

that the Monroe doctrine was the settled policy of the country; declared that the inhabitants of no state or territory had the right to exclude slavery, and insisted that the south must act at once if she would save the union or save herself, and accordingly attempted to form a union of the slave-holding states, having in view the possible withdrawal of those states from the union. His last elaborate speech, which was read by another senator, March 4, 1850, reiterated the complaints about the encroachments of the federal government upon the rights of the south, and asserted that an amendment to the constitution would be necessary to restore equilibrium. This, as appears from a posthumous treatise, *On the Constitution and Government of the United States*, he would have secured by the election of two presidents, one for each section of the country, each having a veto on all acts of congress. His last public appearance was on March 13, and on March 31 he died of pulmonary disease combined with disease of the heart.

Mr. Calhoun was a concise, logical, and earnest speaker; gifted in conversation, and fascinating in manners; assiduous in the discharge of public duties; irreproachable in private life, and a just and kind master to his slaves. He is described as tall and slender, with a thin and angular face, and dark, brilliant eyes. Of ten children, five sons and two daughters survived him. See *Life*, by Jenkins (1851), and by von Holst (1882): Benton, *Thirty Years' View*, and Calhoun's collected works (6 vols., 1853-54).

**CALHOUN**, SIMON HOWARD, D.D., 1804-76; b. Boston, Mass. He graduated from Williams coll., 1829; was ordained to the ministry; went as missionary to Palestine, where he labored with distinguished success for 40 years. He was an authority on the Arabic and Turkish languages, and assisted in making the first translation of the Bible into Turkish.

**CALIBRE**, or **CALIBER**, is a technical name for the diameter of the bore of a fire-arm, whether a piece of ordnance or a small-arm. The ordnance from which solid shot are projected are usually denoted by the weight of each shot, as 24-pounder, 68-pounder, etc.; but mortars, and such guns as project shell or hollow shot, are more usually denoted by the C., such as 18-inch mortar, 10-inch shell-gun, etc.

**CALICO-PRINTING** is the production of a colored pattern on cotton cloth or calico. It appears to have been first practised at *Calicut* in India—hence the term *calico*. From the East Indies the art spread to Asia Minor and the Levant, thence to Augsburg in Bavaria; from whence, at the beginning of the 18th c., it spread to Alsace in France, to Switzerland, and ultimately to England and Scotland. The term as now employed includes all the processes followed in the formation of a colored pattern on cotton, linen, worsted, and silk goods, as also mixtures of two or more of these.

The first operation connected with the printing of cloth is the removal of the surface hairs or minute threads which communicate a fibrous down or nap to the surface of the cloth, and which, if allowed to remain, would interfere with the uniform application of the colors. The surface down is got rid of by the process of singeing, during which the cloth is drawn over a red-hot iron or copper bar or plate, or through a series of gas-jets. The process is repeated twice on the face of the cloth, being the surface to be printed on, and once on the back. In *gas singeing* the cloth is not only allowed to come in contact with the burning gas, but the flame is transmitted through the cloth, and a suction-apparatus is often placed immediately above, so as to draw the flame through more effectually. When well singed, the cloth undergoes the process of bleaching (q.v.), and is thereafter calendered. See **CALENDERING**.

There are several modes or "styles" of applying the colors to cloth:

The *madder style* is that in which a certain fixing agent or mordant is printed on the cloth, which is then introduced into the coloring matter in a dye-vat, when the mordant, having an attraction alike for the fiber of the cloth and for the coloring matter, acts the part of glue or paste, and cements the color to the cloth. Since the discovery in 1869 of a method of artificially preparing alizarin (q.v.), the chief coloring principle of madder, the artificial product has almost entirely displaced the madder root. But the process for printing alizarine is what is called a topical style. The fixing agents or mordants generally employed in the madder style are different strengths of *red liquor* (acetate of alumina), *black or iron liquor* (acetate of iron), and mixtures of these. These are thickened with wheat starch, potato-flour, roasted starch, or dextrine, and gum-arabic, so that the mordant may not run when it is placed on the cloth by the pattern-block or by the printing machine. After the mordant has been imprinted on the cloth, the latter is passed slowly but continuously through a chamber heated to a temperature of from 80° to 120° F., the air being moistened nearly to saturation by jets of steam. The result is, that the mordant is decomposed, the acetic acid is evolved, and the alumina or iron is left attached to the fiber of the cloth in the state of an insoluble sub-salt. As some of the mordant is still left in its original soluble condition, it is necessary to wash the cloth free from this, else, during the dyeing operation, the soluble part of the mordant would run on to those parts of the cloth not intended to be colored, and thus produce a blotted appearance. To obviate this, the cloth, having undergone the process of *drying* and *aging*, is then introduced into a vat containing water, through which is diffused some cow-dung, dung substitute—a preparation of bone-ash, sulphuric acid, carbonate of soda, and glue—or bran. The result of this process of *dunging* is the removal of the soluble part of the mordant, as also the starch, or thickening agent, leaving the decomposed or insoluble mordant adhering to the fiber. The terms *dung-fixing*, *substitute-fixing*, and *bran-fixing*, have reference to the employment of one or other of these agents at this stage of the operation. When

the cloth has been well washed from the dunging, it is introduced into the vat or dye beck containing the coloring matter. The whole is heated by steam-pipes, and the cloth being placed on a sparrow reel kept in motion, is repeatedly wound out of the vat, and returned thereto. The result is, that wherever the mordant adhered to the cloth, the coloring matter is attached thereto, and little or no trace of color adheres to the unmordanted parts. The last operation is the *clearing* or *brightening*, during which the colored cloth is introduced into warm baths of water containing soda, soap, or, for the more delicate tints, bran, and is thereafter acted on by weak acid solutions. The object is to clear the colors, and at the same time to confer upon them the property of resisting the fading action of the air and sun for a much longer time. The different shades of color which can be obtained from the same madder beck or vat, with different mordants, are very numerous, and include reds, lilacs, purples, chocolates, and blacks. Thus, when a weak solution of red liquor (acetate of alumina) is employed as the mordant, a light red tint is procured; with a stronger aluminous mordant, a deep red is formed on the cloth; with a more or less dilute solution of iron liquor (acetate of iron), the cloth is colored lilac, violet, or purple; with a strong solution of iron liquor, black is obtained. Indeed, the same piece of cloth stamped in different places with the various strengths of aluminous and iron mordants, and mixtures of these, and immersed in the madder-bath, will be obtained dyed with all the shades mentioned; and in this manner many of the beautiful variegated colored dresses and handkerchiefs are prepared for market.

The *topical style* in C.-P. is the process whereby certain coloring matters which are insoluble in water, and cannot therefore be applied to cloth by the modes suggested under the madder and padding styles, are treated at once with the mordant, and the mixture by one operation transferred by block, or otherwise, directly on the surface or *top* of the cloth, and hence the term *topical*.

*Padding Style*.—When a mordant is applied, not to any particular part, but to the whole surface of the calico, by the padding machine, it is said to be padded. The mordant is generally either red or black liquor, or a mixture of both. The machine consists of a pair of cylinders over a trough containing the solution, through which, and between the rollers, the cloth is made to pass. It is then dried in a long-heated chamber, and the design printed upon it in an acid discharge, such as citric acid and a salt of potash. When the calico is dunged and dyed in alizarine and other solutions, a white pattern is produced on a colored ground, because the dye does not attach itself to the parts where the acid mixture has been printed. A pattern may also be printed in a stronger mordant than that used for the padded ground, so that we can have, for example, a dark purple as well as a white device on a pale purple ground. The white device may be afterwards wholly or partly filled with color, and in this way designs in numerous shades or colors are produced.

*Indigo Dyeing and Printing*.—The blue indigo (q.v.) of commerce is insoluble in water, but it can be changed by deoxidation into soluble white indigo, which is capable of penetrating cotton fiber; and when calico is "dipped" into white indigo and exposed to air, it becomes blue by absorption of oxygen. When a white pattern is to be produced on an indigo-blue ground, it is printed in resist paste on the calico before it is dyed. This paste varies in composition; one kind being made up with sulphate of zinc, nitrate of copper and soap, thickened with gum. On the resist being removed after dyeing, the white device appears. Clearer whites can, however, be obtained by printing a pattern in some discharging medium on the dyed cloth. Chromate of potash and oxalic acid separately applied—that is, either being printed on and the cloth then passed through the other—will effect the discharge of the blue color. Artificial indigo, which was first made in 1880, is, owing to its high price, not much employed in printing.

*Chrome Yellow*.—A mixture of acetate and nitrate of lead is first printed on the cloth as a mordant, and fixed by dilute sulphuric acid; or, if the nature of the pattern requires it, by other agents. The calico is then worked in a warm solution of bichromate of potash, which produces a yellow color; and if caustic soda or milk of lime be added to the solution, this is deepened into an orange.

*Indigo Blue and Chrome Orange*.—The production of an orange pattern on a blue ground has been a very successful style in the hands of some calico-printers. By means of resists and acids this style can be varied so as to have in the same design orange, yellow, white, and 2 shades of blue, together with green, if Prussian blue be added to the yellow.

*Catechu* (q.v.) is the source of numerous shades of brown, fawn, gray, and drab, which are fast, and can be combined with the colors obtained from madder. It fixes readily upon cotton fiber, but its coloring principle requires to be oxidized by such agents as lime-water, bichromate of potash, or a salt of copper.

*Logwood*.—In C.-P. logwood is used with iron, alumina, and chromium mordants. It is employed for black and chocolate colors.

*Pigment Style*.—Formerly this style was almost confined to printing with artificial ultramarine, but it has been much developed of late years. Other colors, such as vermilion, cadmium yellow, chrome yellow, Guignet's (chromium) green, ochres and umbers, are now printed as pigments on cloth. These colors are not soluble, as is the case with those used in other styles, but must be ground to fine powder and mixed with albumen before being printed. The calico is afterwards exposed in a close chamber to steam, which coagulates the albumen and fixes the pigment. Either white of egg or blood albumen is employed, and some of the colors so printed have great brilliancy.

**Steam Style.**—What are technically called steam colors are fixed upon cotton by the agency of steam. For these the calico is first "prepared" by a padding with stannate of soda, and souring with dilute sulphuric acid, for the purpose of depositing oxide of tin in the fiber. In this style the mordants and colors are mixed together and printed on the cloth. When, for example, alizarine is applied in this way, a mixture is made of the dye with the acetate of alumina or acetate of lime, along with some thickening body such as starch. The printed stuff is either at once steamed in a suitable chamber or piece of apparatus, or it is first exposed for some hours to the air and then steamed. Alizarine colors are not quite so beautiful when produced in this way as when dyed upon mordants by the old madder process above described; but this steam process has the great advantage of enabling them to be used in combination with pigments and other coloring matters, thickened with albumen, since the steam also fixes the latter, as explained in the last paragraph. By the old way, if these pigment colors are used in the same design with madder, they require to be put in with hand-blocks. Among the "steam colors" which have been in use for some length of time are those from Brazil-wood and other dye-woods, the yellow from Persian berries, cochineal red and Prussian blue.

The *resist style* in C.-P. is that in which certain materials are placed on the surface of cloth, to protect it from the adherence of the mordants, and, consequently, to keep that part of the cloth from being attacked by the coloring matter. These materials are termed *resists*, or *reserves*, and they are divisible into mechanical and chemical. The *mechanical resists* are such substances as fats, resins, oils, wax, and pipe-clay. The chemical resists may act on the mordant or on the color. If it be desirable to remove the mordant, and thus leave certain parts of the cloth unable to attach color, the printing of a pattern with some acid substance on the cloth will form with the mordant a soluble salt, which can be readily removed by washing, while the parts which have not been printed in acid are not dissolved away by the washing, and still retain their full power in the colorants to cause the adhesion of the color. For this purpose, where an iron or aluminous mordant has been employed, it is customary to print thereon in the requisite pattern, lemon-juice, tartaric or oxalic acid, and bisulphate of potassa, or a mixture of two or more of these, thickened with gum-arabic. Sulphate of zinc is used to resist the adherence of indigo blue.

The *discharge style* in C.-P. comprehends the employment of similar materials to those used in the resist style, but *after* the cloth has been colored or dyed, and for the purpose of discharging the color, or bleaching the cloth at certain parts, according to pattern. The dischargers for organic coloring matters are chlorine and chromic acid. The chlorine is employed in the form of bleaching-powder (q.v.), and the cloth already dyed is printed with a solution of tartaric acid (or other acid), thickened with pipe-clay and gum, then dried, and passed through a solution of bleaching-powder, when the decoloration occurs, as already explained under BLEACHING. Chromic acid is generally employed in discharging indigo color. The cloth, already entirely blue, is soaked or padded in bichromate of potash, and then an acid discharge printed thereon; and wherever the acid comes in contact with the blue cloth containing the bichromate of potash, chromic acid is liberated and destroys the color.

**Spirit Style.**—In this style the made-up colors are applied topically. Such dyes as Persian berries and sapan-wood are mixed with oxymuriate of tin or other mordants, and printed on the calico. They are not steamed after printing, but simply dried at a moderate temperature, aged for a short time, and washed. The colors are bright, but not permanent. The name has arisen from the tin compounds used being called "spirits."

**Aniline Black.**—This is one of the fastest colors known. One of the mixtures used to produce it is composed of chloride of aniline, sulphide of copper, and chlorate of potash, thickened with starch. More recently vanadium salts have been substituted for sulphide of copper. The calico is nearly colorless when newly printed, but it soon turns black when hung up in warm and moist air.

**Other Aniline Colors.**—With the exception of black, the colors from aniline (q.v.), although fairly durable on silk and wool, are fugitive upon cotton. The brilliancy of some of them, especially the purples, is great. Methylene blue, saffranine (pink), methyl green, auramine (yellow), Bismarck brown, and several other aniline colors, are a good deal used in C.-P. They are fixed by various mordants, such as tannin, or tannin with tartar emetic; or they may be printed on the cloth with albumen. Most aniline colors are steamed after they are printed.

**Seats of the Industry.**—The distribution of C.-P. machines throughout the world in 1882 was: England, 640; Scotland, 280; Ireland, 23; America, 500; Russia, 150; Germany, including Mulhouse (Mülhausen), 100; France, 50; Austria, 25; Switzerland, 24; Portugal, 15, and Holland, 5. See DYEING; DYE-STUFFS.

**CALICUT**, a seaport of the district of Malabar, which, though on the w. side of the peninsula of Hindustan, yet forms part of the presidency of Madras. In lat.  $11^{\circ} 15' N.$ , and long.  $75^{\circ} 50' E.$ , it is distant from Goa and Bombay respectively 800 and 566 miles. It was the first spot in India visited by Covilham (1486), and so populous and powerful was it, that it twice repulsed the Portuguese, slaying their commander in 1509. It stands near the mouth of a small river of the same name, and possessed at one time a good haven. Now its anchorage is merely an open roadstead, at a distance, at least

for large vessels, of 2 or 3 m. from land. Independently of this physical disadvantage, the ravages of war and the competition of superior localities contributed to the decay of Calicut. Accordingly, in 1792, when it fell into the hands of the English, the city was little better than a ruin. Since then, it has made considerable progress, and in 1891 was found to have 68,100 inhabitants. From *C. calico* is understood to have derived its name, just as *cambric* from Cambrai, in the n.e. of France.

**CALIFORNIA**, a Pacific Coast state, and the 18th in order of admission; between lat. 31° 37' and 37° n.; long. 109° 8' and 114° 25' w.; bounded on the n. by Oregon, on the e. by Nevada and Arizona, on the s. by lower California, and on the w. by the Pacific ocean; extreme length, about 750 m.; average breadth n. of Monterey, 200 m.; s. of that point, 300 m.; land area, 155,980 sq.m., or about 99,000,000 acres, of which 13,000,000 are suitable for agriculture, 15,000,000 for mining, lumbering, etc., and 10,000,000 are classed as unproductive.

**HISTORY.**—The name *C.* first appeared in a Spanish romance published in 1521, as that of an island lying near the equator. Between 1535 and 1549 it was applied to the peninsula of lower *C.*, then supposed to be an island, and finally was extended to an indefinite portion of the continent as far n. as the parallel of 42°; the two divisions being ultimately called *Alta* and *Baja*: upper and lower *C.* The coast and islands in the Santa Barbara region were visited by the Spanish explorer Cabrillo, 1542, 1543, and on his death, Jan., 1543, his successor, Ferrello, continued the exploration to about lat. 40° 26'. In 1579, Francis Drake sailed as far as lat. 48°; named the country New Albion, and landed, probably under point Reyes (38° 30'). In 1602, 1603, Vizcaino visited San Diego and Monterey bays; continuing up to Point Reyes. In 1769, July 16th, Franciscan monks founded a mission at San Diego, and in Oct. an overland exploring party from that place discovered the bay of San Francisco. In 1772, the Franciscans gave up to the Dominicans the missions they had founded in the peninsula, and removed to Alta *C.* Secular emigration followed, and soon Alta *C.* was divided into the provinces of San Diego, Santa Barbara, Monterey, and San Francisco; each with a civil and military ruler or *commandante*, and each with a *presidio* or fortified seat of government. Each mission had its priest *presidente*, who ruled independently of the *commandante*, and was only nominally subject to Mexico. The missions spread, almost continuously, along the coast, till in 1823, when the last and most northerly, at Sonoma, was planted, they numbered 21, and the revenues from their great ranches and olive, orange, and grape plantations became enormous. The Indians connected with them were taught agriculture and trades, and were in some instances instructed, but were held in a kind of slavery. The Spanish government, intending to turn the missions eventually into parishes, never formally acknowledged the land claims of the priests, and in 1777 began the establishment of *pueblos*, or towns; in 1813 granting those formed the right to their own councils or *ayuntamientos*. The priests' opposition to these measures, and especially to the Mexican revolution of 1823, hastened their downfall; the Indians were freed from their allegiance in 1826, and relapsed into barbarism, and in 1834 the mission lands and herds were divided.

Commerce with foreign nations was at first forbidden, but early in the present century ships from eastern ports started a trade with *C.* that became very large after 1822, and consisted in the exchange of groceries and cotton goods for hides and furs. In 1826 the first American emigrant wagon train entered *C.* In 1840, Mar. 27, Monterey was made the capital of *C.*, and in 1841, the Russians, who had maintained a trading post n. of Bodega Bay since 1812, abandoned it.

Anticipating a war with Mexico, and believing that England had designs on *C.*, the U. S. government took steps to secure the alliance, if not the annexation of the latter, promised to aid *C.* in attaining independence in case of war, and instructed the consul at Monterey to use his powerful influence to that end, while Com. Sloat, then in the Pacific, was ordered to peaceably occupy the ports of Monterey and San Francisco on the outbreak of hostilities. The plot proceeded smoothly, when Fremont, who was under instructions from Washington to co-operate with Sloat, but was misled by reports of threatened violence to the American settlers, encouraged his countrymen to rise, and they, seizing Sonoma, June 14, 1846, proclaimed a republic. On July 7 Sloat seized Monterey, and war with Mexico having been proclaimed, the U. S. flag was raised at Yerba Buena (San Francisco). Fremont's force was organized into a battalion of mounted riflemen; the main posts from Monterey northward were seized by the Americans, and on Aug. 15 *C.* was declared to be U. S. territory. Concurrent events were a large immigration both by land and water, and the establishment of the military department of *C.* under Gen. Kearney. The discovery of gold at Sutter's Mill, near Coloma, Jan. 19, 1848, gave impetus to emigration to *C.* from all parts of the globe. The great body of gold-seekers, "the argonauts," arrived early in 1849, and by the end of the year the population exceeded 100,000. Nearly all the new-comers were unmarried men in haste to get rich; hence the organization of society was neglected, or hindered by the influx of lawless foreigners. There was reckless speculation, extravagant living, and easy-going morality in many localities; but stable elements were not lacking; the mining camps had stringent laws of their own, and lynch law was resorted to in many quarters. Life and property, however, were not well secured; the people were heavily taxed without representation; and though San Francisco had been made a port of entry and the U. S. customs and rev-

# AREA & POPULATION OF CALIFORNIA & NEVADA BY COUNTIES.

(ELEVENTH CENSUS : 1890.)

## CALIFORNIA.

	Area in Square Miles.	Population.		Area in Square Miles.	Population.
Alameda.....	704	98,864	Plumas.....	2,720	4,993
Alpine.....	755	667	*Riverside.....	.....	.....
Amador.....	568	10,320	Sacramento.....	1,010	40,839
Butte.....	1,720	17,939	San Benito.....	1,000	6,413
Calaveras.....	980	8,883	San Bernardino.....	21,000	25,497
Colusa.....	2,450	14,640	San Diego.....	14,548	84,987
Contra Costa.....	810	13,515	San Francisco.....	50	298,997
Del Norte.....	1,500	2,592	San Joaquin.....	1,380	28,629
El Dorado.....	1,790	9,232	San Luis Obispo.....	3,404	16,072
Fresno.....	8,010	32,026	San Mateo.....	460	10,087
*Glenn.....	.....	.....	Santa Barbara.....	2,380	15,754
Humboldt.....	3,570	23,469	Santa Clara.....	1,380	48,005
Inyo.....	10,020	3,544	Santa Cruz....	425	19,270
Kern.....	7,971	9,808	Shasta.....	3,960	12,133
*Kings.....	.....	.....	Sierra.....	900	5,051
Lake.....	1,125	7,101	Siskiyou.....	5,680	12,163
Lassen.....	4,890	4,239	Solano.....	960	20,946
Los Angeles.....	4,000	101,454	Sonoma.....	1,548	32,721
*Madera.....	.....	.....	Stanislaus.....	1,486	10,040
Marin.....	590	13,072	Sutter.....	590	5,469
Mariposa.....	1,570	8,787	Tehama.....	2,988	9,916
Mendocino.....	3,694	17,612	Trinity.....	3,000	3,719
Merced.....	2,270	8,085	Tulare.....	5,592	24,574
Modoc.....	4,198	4,986	Tuolumne.....	2,048	6,083
Mono.....	3,384	2,002	Ventura.....	1,682	10,071
Monterey.....	3,452	18,637	Yolo.....	972	12,684
Napa.....	850	16,411	Yuba.....	714	9,636
Nevada.....	1,000	17,369			
Orange.....	740	13,589	Total.....	155,980	1,208,180
Placer.....	1,492	15,101			

\* Organized since 1890.

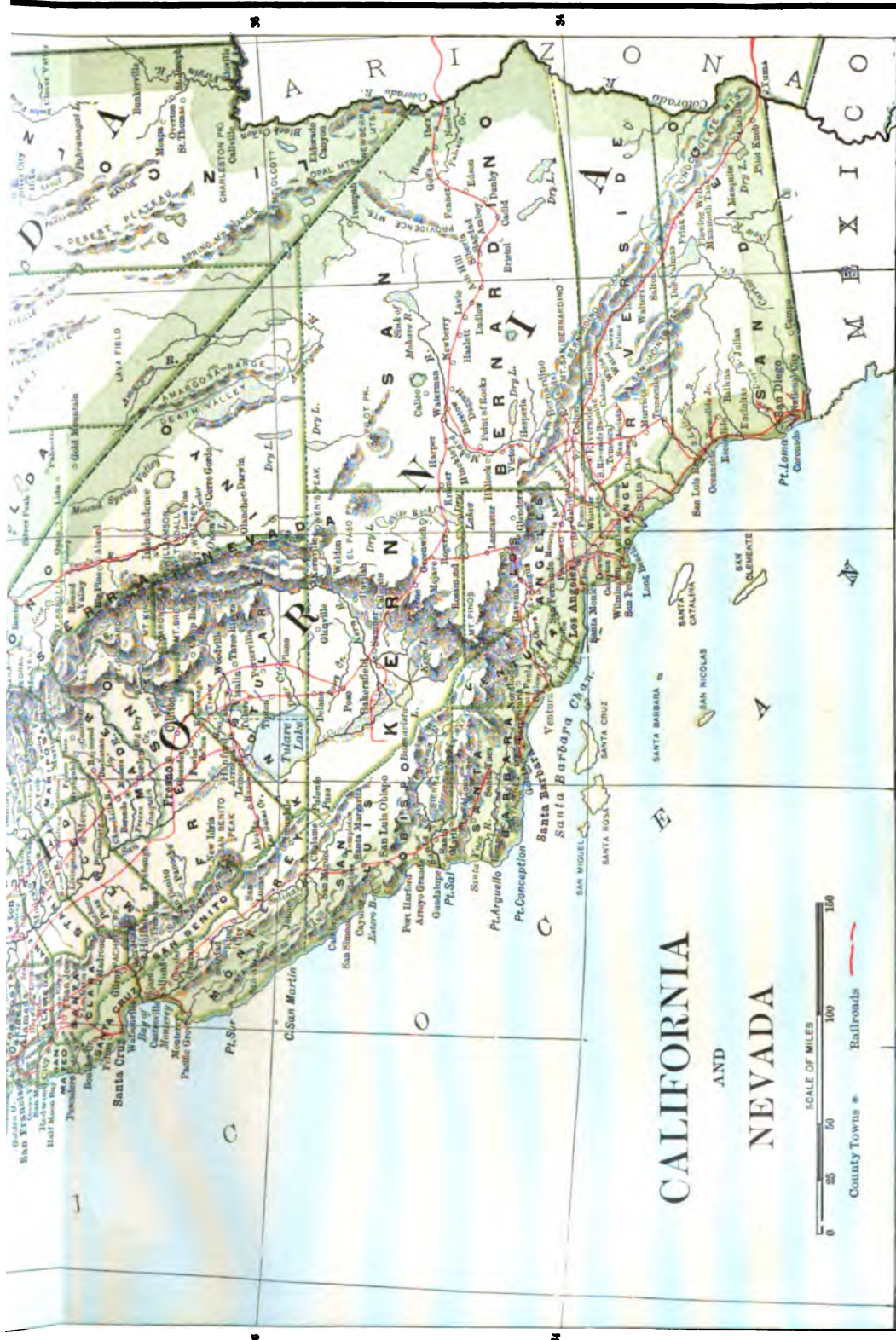
## NEVADA.

	Area in Square Miles.	Population.		Area in Square Miles.	Population.
Churchill.....	4,852	703	Lyon... ..	1,264	1,987
Douglas.....	892	1,551	Nye.....	16,908	1,290
Elko.....	17,652	4,794	Ormsby.....	144	4,883
Esmeralda.....	8,540	2,148	Storey.....	270	8,806
Eureka.....	4,150	3,275	Washoe.....	5,620	6,437
Humboldt.....	16,580	3,434	White Pine.....	9,892	1,721
Lander.....	5,296	2,266			
Lincoln.....	17,680	2,466	Total.....	109,740	45,761









124 Longitude 120 West from 118 Greenwich 116 STAUBER & CO., ENGRS., N.Y.

SCALE OF MILES  
0 25 50 100 150

County Towns \* Railroads

INTERNATIONAL CYCLOPEDIA.



enue laws had been extended over the country, no territorial government had been granted. In 1848 the people made several attempts to organize their own government; in 1849 succeeded, and at a convention, organized Sept. 8, framed a constitution resembling that of New York and prohibiting slavery. This was ratified Nov. 13; on Dec. 15 the state officers were inaugurated, and on Dec. 20 military rule ceased. In Jan., 1850, U. S. senators were elected, and on Sept. 9 C. entered the Union. Opposition was made by southern members of congress, mainly because another free state would be created, and with this same excuse partly, and partly because the native Californians in the s. part of the state were, as they claimed, overtaxed, and had no recognized title to their lands, a plot was formed in 1851 to detach southern C., an attempt that was repeated, on political grounds, just before the civil war broke out. In 1851 the citizens of San Francisco formed "a vigilance committee" to check the lawlessness in that city: trying, banishing and hanging when necessary, and did not surrender its power till 1856. The years 1853 and 1858 were noted for great prosperity. Commerce increased, and the output of gold in 1858 was \$65,000,000, but speculations in all kinds of property followed, with a consequent financial crisis in 1855. When the civil war broke out, C., which was thought to be contemplating secession, was exempted from furnishing troops. The union party, however, was strong, and not only contributed nearly \$1,500,000 to the federal government, but sent 5 companies of volunteers into the field. Extensive fires and floods have visited the state at different times, and some severe earthquake shocks, especially in 1872.

**TOPOGRAPHY.**—Two great mountain ranges extend in a n. westerly and s. easterly direction, and with their spurs occupy a large part of the surface. The coast range consists of numerous broken ridges enclosing rich and narrow valleys, such as Russian river, Napa, Salinas, and Los Angeles. This range, with an average breadth of base of 65 m., varies in height from 1000 to 6000 ft.; in places rises abruptly from the ocean; elsewhere recedes gradually, leaving room for little valleys of great fertility. Its highest peaks are Mt. Ripley, in Lake co., 7500 ft., and Mt. Downie, in Los Angeles co., 5675 ft. Among its principal divisions are the Monte Diablo range, extending s. from San Pablo bay for 150 m., and the Contra Costa range, stretching s.e. from Carquinez strait for about 50 m., and joining the main range at Mt. Hamilton, 4448 ft. high. The Sierra Nevada, or Snowy mountains, starting from Mt. San Bernadino at about lat. 34° n., join the coast range at Tehachapi, and stretching continuously along the e. part of the state for about 450 m., form part of the border, and again unite with the coast range at Mt. Shasta between 40° and 41°. Their average width is 80 m.; their average height from 4 to 15,000 ft.: the greatest elevations attained (excepting Shasta, 14,250 ft.), are between latitudes 35° and 38°. Mt. Whitney is 14,898 ft.; Mt. Tyndall, 14,886 ft.; Mt. Brewer, 13,886 ft. It is estimated that there are at least 100 peaks exceeding 10,000 ft. The w. side of these mountains slopes down into long valleys and cañons, but the e. side is abrupt and ends in a basin from 4 to 5000 ft. above the sea. Of the few available passes, that used by the Central Pacific railroad is elevated 7042 ft. The basin between these great ranges, at some early period the bed of a lake, has a length of 450 m., a breadth of 55 m., comprises about 12 per cent of the entire area of C., and contains 80,000,000 acres of arable land; about one third of it alluvial. The n. part is called the Sacramento valley; the s. the San Joaquin valley. In the n.w. corner of C. the Scott, Siskiyou, and Salmon mountains, from 6 to 8000 ft. high, hem in some small but fertile valleys. The n. e. corner is a plateau about 5000 ft. above the sea. The Mojave basin, a sterile and mountainous tract, lies along the s.e. border for 400 m., measuring 200 m. in its widest part, and elevated from 4 to 5000 ft. Joining this, in the extreme s.e. is the Colorado "desert," about 140 m. long by 70 m. wide, and from 10 to 200 ft. below sea level. The coast, fully 900 m. long, has, as its prominent capes, Mendocino, Arena, Concepcion, and St. Vincent. A few groups of rocky islands lie off the coast; the Farallones, 20 m. w. of the Golden Gate; San Miguel, Santa Rosa, and Santa Cruz, s. of port Concepcion, and still further s. San Nicolas and others. Among the many good harbors are Humboldt, Bodega, Tomales, Monterey, San Luis Obispo, Santa Barbara, Santa Monica, San Pedro, and San Diego. San Francisco bay (q. v.) is the best harbor on the Pacific. The largest and the only navigable rivers, except the Colorado, which forms the boundary with Arizona, and is navigable to Callville, 612 m. from its mouth, are the Sacramento and San Joaquin, each about 850 m. long, flowing through the valleys called after them, to unite near lat. 38° and empty through Suisun bay into the bay of San Francisco. The Sacramento receives from the Sierra Nevada the Pitt, Feather, Yuba, American, Consumnes, and the Mokelumne rivers, and is navigable to Sacramento city. The San Joaquin receives from the same range the Calaveras, Stanislaus, Tuolumne, Merced, Chowchilla, and Fresno, and is navigable for light boats nearly to the Sierras. The Tuolumne falls 4650 ft. in 23 m. The Kings, Tule, and White rivers empty into Tule lake; the Kern into Kern lake. The chief rivers flowing from the coast range into the Pacific n. of San Francisco are Smiths, Klamath (about 225 m. long), Mad, Elk, Eel, and Russian—all permanent streams. Among those s. of San Francisco are the San Lorenzo, Pajaro, Salinas, Santa Inez, Santa Clara, Los Angeles, San Gabriel, and San Diego—all coursing through rich valleys, and permanent to within 10 or 15 m. from their mouths. The largest lake, Tulare, in the s. part of the state, is about 88 m. long by 22 wide, and only 40 ft. deep. To the s. and n.e. are Kern and Owen's. Mono, sometimes called the Dead Sea of C., in lat. 38°, is 14 m. by 9 m., and elevated 7000 ft. Tahoe, 6247 ft. above tide, is 20 m.

long by 10 wide, and 1500 ft. deep. Donner lake, a little n.w., is sadly associated with the early immigrants; Mirror lake, in Yosemite valley, is famed for its transparency. Clear lake, in Lake co., is 25 m. long. In the n.e. are many alkaline and saline lakes—Klamath, Goose, Eagle, etc. Sulphur, iron, and soda springs abound, and among the hot springs that are favorite resorts are Calistoga, Gilroy, Paso Robles, Santa Barbara, and Matilija.

No other state contains such impressive scenery or so many places of resort. There are the great granite domes of Mts. Whitney, Tyndall, Brewer, Dana, Castle, and Lyell, and the isolated cone of Mt. Shasta, snow-covered most of the year, dotted on its slopes with extinct craters and holding 5 glaciers on its n. side. The coast range is full of beautiful valleys, and among the grander ones of the Sierras are the Yosemite (q. v.), Tuolumne, Hetch-Hetchy, Death, and Upper Kern. The Santa Cruz mountains are called the Adirondacks of the state. The falls of Yosemite creek and of the Merced, Tuolumne, Fall, and other rivers are a few of the many deserving extended notice. The geysers of Pluton river and those in Shasta co., the mud "volcanoes" near San Diego, the petrified forest near Calistoga, the lava beds of Modoc co., the innumerable hot and cold springs, and the fine sea-beaches, rightfully claim attention. The groves of *Sequoia gigantea*, or "big trees," 9 in number, are included between parallels 36° and 38° 15'. The most northern and the first discovered, in Calaveras co. has 100 trees of large size, the highest 325 ft.; the next, 319; while 20 are over 250 ft. The largest in circumference measures 61 ft. six ft. from the ground.

**GEOLOGY.**—Almost all the n.e. consists of volcanic rocks, and the number of extinct volcanoes, such as Shasta, is large. Eruptive activity continued later in the coast range than in the Sierras. Metamorphic and eozoic formations occur widely in the n.w., and are continued along the Sierras and the San Bernardino mountains. The central mass of the Sierras and their highest peaks in the s. are granite. Tertiary and cretaceous sandstones, the latter, of marine origin, are found in the foot-hills. What is called the auriferous gold belt comprises the detached triassic and jurassic fields bordering the Sierras. The coast range is almost wholly cretaceous and tertiary.

**MINERALOGY.**—C., though third in the production of precious metals, still leads in the output of gold. This was obtained by washing, as early as 1841, near San Fernando mission; but it was the discovery at Sutter's Mill, near Coloma, in 1848, that made evident the abundance of the metal and attracted the excited throngs of adventurers. Many of these engaged in river mining—i.e., washing in sheet-iron pans or wooden "rockers," the gold from the sands or gravels from or near river channels; others dug the gold "dry" from the crevices of the rocks. About 1851 sluices were introduced, by means of which the gravels or sands were flowed over the bottom of a wooden box provided with blocks of wood or round stones to catch the gold as it sank. Digging soon extended from the rivers and the gulches leading to them to higher ground, where the difficulty of washing was increased; but in 1852 the hydraulic system was brought in. In this, continuous streams of water are directed through powerful nozzles upon a gold-bearing bank or deposit. This was so successful that whole hills were reduced and swept away, but its use was soon forbidden by law, as the detritus threatened to choke the rivers. Nearly all the mines are on the western slope and in the foot-hills of the Sierra Nevadas in a belt of country about 220 m. long by 40 wide, extending into Oregon. The gold is found in a metallic condition, but is usually mixed with silver or other metals. In stream or alluvial deposits ("placers") it occurs as fine scales or coarse grains; in rocks, in quartz veins or ledges; and costly machinery must be used to crush the rock, from which the ore is extracted by amalgamation with quicksilver. Where, as often is the case, the gold-bearing gravels underlie volcanic rock several hundred feet thick, drift or tunnel mining combined with sluicing is necessary. The chief gravel mining region extends from Mariposa co. into Plumas co., or between parallels 37° and 41°, and includes some quartz veins. The profitable quartz mines have decreased in number. Of those belonging to incorporated companies, the Bodie, in Mono co., in three years yielded \$5,500,000 gross and \$2,475,000 net. Silver of rich quality is found, but the output is small. Cinnabar abounds in the Sierras and in the s. part of C., particularly in Monterey and Santa Clara cos.; magnetic iron of superior grade in Sierra co. and in the coast range, where also are deposits of chromic iron and manganese. Iron and copper pyrites exist with gold in many quartz veins; copper, nearly pure, in the n.w. and in the southern coast range, but the real copper belt extends from Plumas co. to Mariposa co., and is from 20 to 25 m. w. of the main gold-bearing belt. Tin is found in the Temescal valley, zinc and lead in the quartz veins of the gold belt, argentiferous galena in San Bernardino co. and e. of the Sierras, platinum in Klamath valley. Among other mineral products are plumbago, cobalt, freestone, buhrstone, granite, basalt suitable for pavements and buildings; rhyolite, bluish and light brown sandstones from San Francisco bay, and from San José a light brown variety, which is almost pure silica, cuts easily and stands fire well. Kern co. yields marbles of many shades; Colfax, drab marbles; El Dorado co., fine white, streaked with blue; and in Inyo co. some of the foot-hills are composed of white marble equal to Italian. Bituminous coal is mined in Monte Diablo and neighboring hills. Hydraulic limestone, bismuth, brick and porcelain-clay, gypsum, alum, sulphur, borax, salt, and diamonds, onyxes, and other precious stones may be added to the list. Bitumen is found in several places, and petroleum in Monterey, Santa Cruz, Ventura, and Los

**Angeles cos.** The Los Angeles oil has a specific gravity of  $42^\circ$ , is green in color, and its refined products are benzine, gardine, water-white illuminating oil, standard white oil, lubricating gas, and fuel oil. Between 1848, when gold was discovered, and the end of 1896, the total production of gold and silver was valued at \$1,475,434,107, and gold alone, \$1,368,429,278. In 1896 the gold product was valued at \$13,863,281. The quicksilver production was 30,743 flasks, and since 1877, 810,767 flasks. Other mineral products in 1896 were petroleum and bitumen, over \$1,000,000; borax, \$800,000; mineral waters, \$400,000; natural gas, \$150,000; and salt, \$130,000.

**ZOOLOGY.**—The animals include the black, brown, and the cinnamon bear; panther, gray wolf, wolverene, wild cat, mountain cat, 5 species of fox, fisher, coyote, black-tailed deer, raccoon, otter, badger, skunk, yellow-haired porcupine, hair seal, sea-lion, 3 species of hare, 2 of rabbit, 8 of gopher, 8 of squirrel, 2 of ground squirrel, 6 of rat, 10 of mice, and 16 of bat. The mammals number 115 species, but the grisly bear, elk, antelope, mountain sheep, and beaver are now rare. The 350 species of birds include the golden and bald eagle, vulture (the largest flying bird in North America), buzzard, 19 species of hawk, 9 of owl, raven, magpie, 12 species of woodpecker, 11 of flycatcher, 2 of quail, 4 of humming-bird, 3 of oriole, the roadrunner, cedar-bird, barn swallow, water ousel, robin, swan, canada goose, mud hen, crane, heron, pelican, albatross, guillemot, loon, and puffin. Among 240 species of fish are the sturgeon, shark, cod, turbot, jewfish, mackerel, halibut, rockfish, pompano, barracouta, and flying fish. Oysters, clams, lobsters, crabs, and shrimps abound. Shad, perch, pike, etc., are found in many rivers, and trout in the mountain brooks and lakes. Salmon ascend the rivers n. of Santa Barbara twice a year. Among reptiles are the rattlesnake, racer, horned toad, and salamander, and in the extreme s. centipedes, scorpions, and tarantulas are occasionally met with. There are 25 to 30 species of ant.

**BOTANY.**—The native flora comprises about 2500 species, and differs decidedly from that of states lying to the e. Few of its deciduous trees can be used for timber or manufactures, and many common on the Atlantic slope are lacking. Hills shut off from sea breezes are treeless, yet trees and grasses thrive at higher elevations than in the Alps, and 2 trees are found 1000 ft. above the snow line. The w. side of the Sierra Nevada range is thickly wooded, as is that of the coast range n. of  $35^\circ$ ; but the eastern slope of the coast range and its whole extent s. of lat.  $35^\circ$  are treeless. The foot-hills up to about 2500 ft. are covered chiefly with black oak, nut pine, and the lofty sugar pine and Coulter's pine. The Douglas spruce, pitch and sugar pines, and white cedar (*libocedrus decurrens*) occupy a second belt reaching to 5000 ft., and above these, in the central part of the state, coniferæ such as the tamarack pine and lovely fir grow to a height of 7 to 9000 ft. The sequoia, or big trees, are described under *topography*. The coniferæ are numerous, and among them are the redwood, used for railroad ties and house furnishing; the western yellow pine, furnishing lumber, resin, and turpentine; red fir occurring in thick groves and attaining a height of 800 ft., its wood used for ship-building and houses; the fragrant cedar, excellent for inside work and furniture; the black fir, western juniper, twisted pine, arbor vitæ, western yew, and the rare Monterey cypress. The chestnut oak is used for tanning, but the abundant and majestic white oak is useless for timber. On hill-sides numerous branching and prickly shrubs, the live oak, madrona, manzanita, coffee berry, etc., form almost impenetrable thickets called chaparral. The numerous brilliant and delicate flowers include the mimulus, larkspur, tulip, lupine, poppy, tiger lily, alfalfa, and shooting star. The *yerba buena*, a vine-like plant, resembles the strawberry. The mistletoe and Spanish moss are among the parasites. Wild oats grow to great height on the hills and plains, as do the spiked clover and tulé or reed in river bottoms and marshes. The prickly pear is the only wild fruit that is not insipid. The eucalyptus has been naturalized, but is less valued for economic uses than formerly.

**SOIL AND CLIMATE.**—In the valleys the soil is either a rich loose loam, or a light or heavy clay called adobe. On elevated table-lands it is rich, mellow, and easily worked; in the timber lands it resembles that in similar localities in the eastern states; even the so-called desert needs only irrigation to make its sands prolific. The soil of the greater part of s. C. is composed of disintegrated granite. Two seasons, the wet and the dry, divide the year; the first so called, because it is the only period during which it rains, though rains are not continuous, and the average fall for the state, 23 in., is less than at Chicago or St. Louis. At Crescent City the average is 84 in.; at Redding, 88; at San Francisco, 23; at Sacramento, 19; at Los Angeles, 12; at Bakersfield, 5; and at San Diego, 10. This season lasts from about the middle of Nov. till April or May. North of Sacramento light snows are not unusual, and in the mountains of the n. and e. snows are heavy and lie long; but the winters are comparatively mild everywhere, and vegetation is not only green but active. At San Francisco snow is almost unknown, the mercury never remains at freezing point 24 hours, and flowers bloom in the gardens at Christmas time. Early spring, comprising the latter part of Feb. and the month of Mar., is the most delightful part of the year. The air is mild, the sky clear, and the landscape gay with flowers. Summers are dry except along the coast for from 6 to 10 m inland, where fogs are likely to occur, and, except in sheltered places, trade winds prevail. These enter the Golden Gate with peculiar violence, dividing to pass n.w. and a.w., and giving the valleys opening toward San Francisco bay a climate peculiarly their



own. In the high Sierras there is little rain or snow, and at altitudes of from 8 to 12,000 ft. it is warm at noonday. There is so little fear of moisture that on the inland farms sacks of grain are left lying on the ground for months at a time. The great heat of the interior and of the s.e., where, as at Fort Yuma, the average temperature is 92°, is from its dryness easily borne, and sun-strokes never occur. There are no thunder storms in C. In the extreme n. and n.e. the summers resemble those of the eastern states. Everywhere the nights are cool, or at least endurable; the clearness of the atmosphere causing rapid radiation. Owing to the equably cool summer climate of the coast between parallels 35° and 40°, San Francisco in July is cooler than San Diego by 7°, and than New York by 17°, and does not gain its highest temperature until the trade winds cease in September. During the summer the earth becomes dried to a depth of several inches; the air is filled with dust, the vegetation is burned brown, and the smaller streams disappear, a state of things that lasts until the autumn rains begin. The Sacramento and San Joaquin valleys are relatively warmer and colder than the coast region, Sacramento registering 73° in July and 45° in Jan. to San Francisco's 56° and 49°. At Monterey the difference between the average temperature of Jan. and July is 6°; at Los Angeles, 12°; San Diego is 6° or 7° cooler than Charleston or Vicksburg, which are nearly in the same latitude. The prevailing winds at San Francisco are from the s.w.

Among prominent winter resorts are San Diego, noted for its fine harbor, on one side of which is the famous Coronado Beach; Santa Barbara, overlooking the Pacific, is a favorite watering place; Santa Monica is noted for surf bathing throughout the year; Santa Cruz has a fine beach and background of mountains; Monterey, on beautiful Monterey Bay, is associated with the earlier history of the province under Spanish rule; Indio, over one hundred feet below the sea level, is remarkable for the cures effected by its pure air in pulmonary diseases. Los Angeles and the adjoining villages are located in a section that has well been termed "our Italy"—a paradise of rose gardens, vineyards, and lemon and orange groves. Other resorts are the Arrowhead Hot Springs, El Paso de Roble, Napa Soda Springs, and a score of others.

**AGRICULTURE.**—C. was formerly noted for the generally large size of its farms, dairies, and orchards, and many still remain undivided. The Stanford stock-farm is 1400 acres in extent; the Glenn farm in Colusa co. comprises 60,000 acres, and a vineyard near Sonoma has nearly 600,000 vines. The mild winters and dry summers and the absence of sod in the valleys, making a first plowing easy, are among conditions favorable to agriculture, often offset, however, by drouth, lack of water, and the abundance of rodents. The soil is generally rich, and on the largest area of the state the average annual rainfall is sufficient to mature all cereal crops without artificial irrigation; but irrigation is general in the San Joaquin valley and southward, and is necessary wherever the rainfall at any season is less than 10 ins. The Bear Valley reservoir holds water sufficient to supply 20,000 acres. Artesian wells have transformed many parts of southern C. supposedly barren, even in the "Colorado desert."

In nearly every part of C. wheat, barley, rye, oats, hops, and broom-corn can be raised, but the cool nights and dry summers are not favorable to Indian corn. Middle and upper C. produce the most wheat. The varieties used are chiefly the Chilian and Australian. Sowing is done between Nov. 1 and Apr. 1, and harvesting from the middle of June to the middle of July. The average yield per acre is 20 to 25 bush. The wheat has a fine, light-colored berry, the dryness of which makes it peculiarly valuable for shipping, but wheat growing has proved less profitable than fruit culture. The climate and soil are remarkably suited to barley. Oats, rye, and buckwheat occupy but a limited acreage. The sugar-beet is extensively raised, as in Alvarado and Alameda cos., and Ventura co. is celebrated for its beans. Cotton was cultivated as early as 1856, but the yield is small as yet. It grows without irrigation, and has been raised as far n. as Shasta co. The yield per acre is greater than in the southern states, the fiber is fine, long, and white, and the absence of rain during the picking season is a decided advantage. Ramie, New Zealand flax, jute, and tobacco are planted to some extent. The tulé lands of the coast and the river valleys would, it is believed, produce large crops of rice.

Oranges were first planted in Los Angeles, and up to about 1872 the production was almost confined to that region. A large part of central and northern C. has since been found to be adapted to citrus culture, and the citrus belt now extends along the foot-hills from Shasta to Tehachapi. In many places oranges grow without irrigation, and in Nevada co. they are raised at altitudes of from 1100 to 1600 ft. Owing to the dry warmth of the inner valleys and to the longer days in summer, the fruit ripens at Oroville, Newcastle, etc., 6 weeks earlier than at Riverside or Pasadena. In southern C. oranges are gathered fresh from Christmas to July, and lemons and limes all the year. Nine or more varieties are grown, and from the sweet navel, or seedless orange, a non-alcoholic wine is made. The annual shipment of oranges, lemons, and limes exceeds eleven thousand tons. Viticulture was early introduced by the monks, but no specialty was made of it until 1857, when great interest was developed, and the state sent Agoston Haraszthy to Europe to study new methods. In 1880 the State Viticultural Commission was appointed, and now two hundred thousand acres are planted to vineyards. The choicest and hardiest European wine grapes have been imported, and are rapidly replacing the less desirable varieties. The phylloxera, which for some years made great havoc, is being overcome by rooting out the inferior kinds, and by grafting choice varieties on native wild vines known as *resistant* vines, which the phylloxera will not

attack. The annual production of wine is over sixteen million gallons, while that of grape brandy has reached twenty-five million gallons. California raisins are equal to the finest Spanish raisins. Fresno county is the principal raisin section of the state. The annual shipment has exceeded thirty million pounds. The blue fig originally grown has been supplanted by varieties of the white fig, which thrive in the dry, warm, alluvial valleys of the interior. In Tehama county the trees yield from three to four crops yearly. Olives are extensively cultivated, and at Lander Station, Shasta county, grow at an altitude of twenty-four hundred feet. The average number of trees planted to the acre is one hundred. The fruit is usually picked from Nov. to Jan., or later, and is either pickled or made into oil. English walnut culture is becoming profitable. The almond crop is about five hundred thousand pounds. Italian chestnuts, filberts, pecans, and pistachio nuts are also raised.

The long list of fruits includes peaches, nectarines, plums, apricots, guavas, apples, pears, cherries, pomegranates, prunes, persimmons, loquats, or Japanese plums, and bananas, which grow as far n. as the Sacramento Valley. The date palm is successfully raised in Fresno and other southern counties, and occasionally fruits in the Sacramento Valley. Apples, plums, pears, strawberries, blackberries, etc., thrive best at high altitudes. An apple orchard near Lake Tahoe is 6200 ft. above the sea. In southern C. guavas and strawberries are gathered nearly all the year. Large quantities of fruit are artificially cooled when picked, and sent to the eastern markets in refrigerator cars—Sacramento shipping more than all the rest of the state; while the demand for the canned and dried fruits comes from all over the world. The annual shipment of dried peaches, apricots, nectarines, and prunes alone exceeds eight thousand tons. Thousands of both black and white mulberry trees have been imported from Italy for the silk worm; both the trees and the silk worm are remarkably free from disease in this climate, and the cocoons are becoming articles of export. No better country than this can be found for bee keeping. The valleys produce alfalfa and mustard, and the mountains abound in aromatic sage brush and flowers which impart to the honey a delicious flavor. The annual product has reached six million pounds of honey, besides immense quantities of comb and bees' wax. Ostrich farming has been tried, and there are now several ranches. In the vicinity of Stockton large quantities of chicory, mustard, and the Persian insect powder plant are raised.

The native grasses, oats, and clover dry without cutting, but constant pasturage has almost exterminated them and alfalfa in moist regions, and Texas mesquit grass in dry hills and plains are taking their place. Alfalfa yields three to four crops a season. Hay is largely obtained by mowing wheat and other small grains before maturity. Stock are fed through the fall and early winter, but are not housed. This state ranks third in the union in sheep and wool. Several immense ranches are devoted entirely to sheep and cattle raising. Horse breeding has received some attention in recent years; several famous race-horses have come from the ranches of California. The last census reports give the total value of all agricultural crops at over \$100,000,000 per annum.

**MANUFACTURES, ETC.**—These include foundry and machine shop products, lumber products, and ornamental woods, leather and leather goods, wine and brandy, silk fibre and fabrics, flour, grain bags, salt, acids, chemicals, and many others. San Francisco, besides numerous other manufactories, has immense flouring mills, from which over a million barrels of flour are exported annually; the oldest cordage factory on the Pacific Coast, established in 1858, and covering sixteen acres. Stockton also has immense flour mills. Immense red wood mills are located at Fort Bragg; salmon canneries on the Eel, Klamath, and Smith rivers; salt at Santa Monica, San Diego, and a number of other places; soda at Keeler, and immense factories of various kinds at San José, Los Angeles, San Bernardino, and Sacramento. The latter is also the seat of the immense car shops of the Pacific Railroad. The first beet-sugar factory in the state is at Alvarado.

**COMMERCE** centers mainly at San Francisco, two thirds of all the merchandise imported entering there, and the great lumber trade of the Pacific Coast finding its chief market in that city. The other customs districts are Wilmington, San Diego, and Humboldt. There are lines of steamers to Alaska, British Columbia, Oregon, etc., and to New York, Great Britain, Hawaii, China, Japan, Australia, and South America. The cargoes to Europe consist mainly of wheat, canned fish and fruits, honey, borax, and ores; to Asia and the islands of the Pacific, large quantities of butter and cheese, canned and cured meats and fish; to Mexico and China, quicksilver. Shipments across the continent include fruits, fresh, canned, and dried, cattle-products, and honey. In the calendar year 1896 the imports of merchandise at the various ports were valued at \$37,291,403, exports, \$40,162,027; imports of coin and bullion \$11,864,424, exports \$11,125,756; total imports, \$49,155,827; exports, \$51,287,783; total foreign trade, \$100,443,610.

**BANKING.**—In 1896 there were 31 national banks in operation, with combined capital \$7,525,000, deposits \$17,183,282, and reserve \$6,586,814; 174 state banks, capital \$40,000,938, deposits \$53,630,156, and surplus \$17,165,115; 57 stock savings banks, capital \$8,904,025, deposits \$131,653,636, and resources \$147,812,564; and 20 private banks, capital \$1,153,253, deposits \$1,039,019, and resources \$2,632,475. The exchanges at the U. S. clearing-houses at San Francisco and Los Angeles aggregated \$754,102,630; increase in a year, \$25,223,693.

**RAILROADS.**—The two principal railroad corporations are the Central Pacific and the Southern Pacific. Nearly all the shorter lines are leased to one or the other of these.



The tunnel on the San Francisco and Northern Pacific road between Cloverdale and Ukiah City is two thousand feet long. On the Central Pacific are thirty-three miles of wooden tunnels, known as "snow sheds," and costing from \$40,000 to \$1,100,000 per mile, according to the amount of masonry needed. On the Southern Pacific, just north of Tehachapi summit, is a series of curves, during which the railroad actually crosses its own pathway. The Southern Pacific connects at New Orleans with steamship lines for Europe. In 1896 there were over 7,000 miles of steam railroad in the state, and railroad property was assessed for taxation at \$43,223,344.

**CHURCHES, EDUCATION, ETC.**—All the leading religious denominations are represented, with a conspicuous absence of the minor sects and of those usually maintained by the foreign element. The Roman Catholic, with its numerous missions, is the largest numerically. The school fund is derived from state, county, and district funds. The state fund is about \$3,000,000. The total value of school property is \$16,408,630; annual expenditure for common schools, \$6,109,082. There are five normal schools and four normal departments. The State University at Berkeley, an outgrowth of the State College chartered in 1855, has a liberal endowment. Its schools of Law, Medicine, etc., are at San Francisco. Lick Observatory (q. v.) is also connected with it. Among the fourteen other colleges in the state are Leland Stanford Junior, at Palo Alto, with a princely endowment; University of Southern California, Los Angeles, with its school of Agriculture at Ontario, and Theological School at San Fernando; the Roman Catholic colleges at San Francisco, Los Angeles, Oakland, and Santa Clara; Pacific Methodist, Santa Rosa; California, at Oakland; Pomona, at Claremont, and University of the Pacific at San Francisco. The Cogswell Polytechnic at San Francisco, founded in 1888, with an endowment of \$300,000 is maintained by the city. There are theological schools at Oakland, San José, and San Rafael; art schools at San Francisco, San Diego, and Sacramento. The California academy of Sciences, founded in 1853, and endowed by James Lick (q. v.), is at San Francisco. Public libraries are found in the principal cities. The first newspaper was published in Monterey in 1846; in 1896 there were 674 newspapers and periodicals.

**GOVERNMENT, ETC.**—The capital is Sacramento. According to the constitution adopted in 1879, legislative sessions are biennial, begin on the first Monday after Jan. 1, and are limited to 60 days; legislative elections are held on the Tuesday following the first Monday in Nov. No one convicted of embezzlement or defalcation in any state in the union can hold office. Senators (40) hold for 4 years; assemblymen (80) 2 years, and all receive \$8 per day and 10 cents mileage. All state officers hold office 4 years. The governor receives \$6000 salary, and may veto special items in appropriation bills. Males who have lived one year in the state, 90 days in the county, and 30 days in the voting precinct have the right of suffrage, but Chinese and Indians are excluded. The supreme court consists of 7 judges, elected for 12 years and receiving \$6000 salary each. No Judge of supreme or superior court can receive salary unless he swears that no case in his court submitted 90 days previous remains undecided. Each county elects its superior judges. Appropriations to sectarian schools are prohibited. The legal rate of interest is 7 per cent., but any rate is allowed by contract. Women may enter upon or pursue any lawful business, vocation, or profession, and the property of married women belongs to them alone.

The state institutions not educational are the prisons at Folsom and San Quentin, the insane asylums at Napa, Stockton, Agnews, and Ukiah; the State Reform School at Whittier (which is conducted on the cottage plan, and farming and various trades are taught); the Preston School of Industry at Lone city; Home for Feeble-Minded Children at Glen Ellen, and Institution for Deaf, Dumb, and Blind at Berkeley. There are also nineteen orphan asylums, receiving state aid and inspection. The only American naval station on the Pacific Coast is at Mare's Island. Other national institutions are the Presidio Reservation on the Golden Gate—the largest garrison on the Pacific Coast; several forts in different parts of the state, all occupied by U. S. soldiers; and the Soldiers' Home at Santa Monica.

The National Guard of the state numbers about four thousand men, organized into seven regiments and four companies. Occasional encampments are held, and some attention is given to rifle practice. The total number liable to military duty is over 203,000. The naval battalion numbers five hundred.

The registration of voters is required in this state. New ballot laws, based on the Australian system (q. v.), were adopted in 1891.

The electoral votes have been cast as follows: 1852, Pierce and King, 4; 1856, Buchanan and Breckinridge, 4; 1860, Lincoln and Hamlin, 4; 1864, Lincoln and Johnson, 5; 1868, Grant and Colfax, 5; 1872, Grant and Wilson, 6; 1876, Hayes and Wheeler, 6; 1880, Hancock and English, 6; 1884, Blaine and Logan, 8; 1888, Harrison and Morton, 8; 1892, Harrison and Reid, 1; Cleveland and Stevenson, 8; 1896, McKinley and Hobart, 8; Bryan and Sewall, 1.

**FINANCES.**—The total bonded debt at the end of the biennial term 1893-5 was \$3,377,500, of which \$1,526,500 was held in trust for the state school fund, and \$751,000 for the university fund. In 1896 the total assessed valuations was \$1,266,593,065, and the aggregate county debt, \$4,909,187.

**POPULATION.**—The pop. in 1830 was 22,500—18,000 Indians; 1860, 379,994; 1880, 884,964—292,874 foreign born, including 18,889 British Americans, 42,532 Germans, 62,962 Irish; colored, 97,513—75,218 Chinese and Japanese, 20,000 of whom were in San Francisco, and 16,277 Indians; pop. 1890, 1,208,130. There are 57 cos.; for pop. 1890 see census tables, vol XV. The largest cities, 1890, were San Francisco, 298,997; Oakland,

48,682; Sacramento, 26,272; Los Angeles, 50,395; San José, 18,060; San Diego, 16,159. Stockton, 14,424. The tribal Indians are on 5 reservations, and numbered 5020 in 1890; Those not under an agent numbered 6669. The aborigines in northern C. are much superior to those in the south. Under Mexican rule the Indians were recognized as owners of their lands, but the U. S. never acknowledged the right. In 1870, there were 29,000 Indians in upper and lower C. The principal tribes were the Klamaths, the Hoopas, the Ukies, the Redwoods, the Tulés, the Tejons, the Siahs, the Wylackies, the Concous, the Wichumnies, the Coweas, and the Yokas.

See histories of C. by H. H. Bancroft (6 vols.), by Hittell (1885) and Royce (1886); King's *Mountaineering in the Sierra Nevada* (Boston, 1874), Cone's *Two Years in California* (Chicago, 1876), Hittell's *Resources of California* (San Francisco, 1876), Nordhoff's *California* (New York, 1882), Shinn's *Mining Camps* (New York, 1885), Van Dyke's *Southern California* (New York, 1886), Lindley's *California of the South* (New York, 1888).

**CALIFORNIA, GULF OF** (Span. *Mar Bermejo*, Red sea), an arm of the Pacific ocean dividing the peninsula of lower California from the rest of Mexico. It was originally known as the sea of Cortez, having been discovered under his auspices, and explored by himself. It is 700 m. in length and varies in width from 70 to 150 m. It receives at its upper end the united streams of the Gila and Colorado, and from the e. several streams. It contains many islands, particularly towards its head, and its coasts are broken by numerous small bays. On its western shore are the ports of Loreto and La Paz; on its eastern, those of Mazatlan and Guaymas. Navigation, except in the southern part, is somewhat unsafe. There are pearl fisheries on the western coast.

**CALIFORNIA, LOWER OR OLD** (Sp. *Baja* or *Vieja* C.), a Mexican territory and peninsula, between lat. 22° 40' and 32° 40' n.; bounded on the n. by C., e. by the Colorado river and the gulf of C., s. and w. by the Pacific ocean; about 750 m. long by 80-160 wide; area, 61,562 sq. m. An expedition sent out by Cortez, 1583, discovered the coast, and in 1586 Cortez himself discovered the gulf of C., which in 1540 was navigated by Alarçon to the Colorado. In 1697 the Jesuits established missions, but were expelled in 1767 and succeeded by Franciscan monks, who in 1772 withdrew to upper C., giving up the field to Dominicans. The missions gradually declined, and in 1883 were secularized. The coast range on the w. and Sierra de la Gigantea, a continuation of the Sierra Nevada range on the e., extend through the peninsula, averaging 8 to 4000 ft. in height, but with peaks exceeding 12,800 ft. The peninsula, which is of volcanic formation and subject to earthquakes, is in its upper part like northern C.: well watered, abounding in fertile table-lands and valleys, and producing all the fruits and vegetables of the n. temperate zone. A few streams, such as the San Rafael, are of considerable size. The s. part has large areas unfit for habitation. The coast is broken by many bays and lined with numerous islands. The summer temperature is agreeable in the n. and s., but excessive along the gulf. Severe rains and violent winds occur in winter. Mineral products include gold, silver, copper, galena, quicksilver, coal, sulphur, lime, gypsum, salt, and diamonds. The northern mountains are well wooded, and the native trees include the pine, cedar, spruce, live oak, cottonwood, acacia, and palm. Cacti of great size grow in the s. Antelopes, moose-deer, and mountain sheep are found in the mountains. Among agricultural products are maize, wheat, manioc, sugar-cane, citrus fruits, pineapples, bananas, grapes, olives, plums, etc. The industries are mining, stock raising, and whale and pearl fishing. Ensenada and La Paz are the capitals. An international company has obtained large grants and concessions from the Mexican government, and emigration from the U. S. is fast developing the varied resources. See Taylor's *Historical Summary of Lower California*; Nordhoff's *Peninsula California* (1886).

**CALIFORNIA, UNIVERSITY OF**, at Berkeley, 5 m. n. of Oakland, was established in 1868, as a non-sectarian institution, under the laws of the state, and united with it the coll. of C., organized in 1855. Instruction was begun in Oakland in 1869. The university occupies a beautiful site of 250 acres, and has among its buildings an art and library building with over 65,000 vols., an observatory, a well-equipped gymnasium, and mechanical, mining, and chemical laboratories. Its museums of geology, mineralogy, zoology, and botany are remarkably rich. The departments of instruction comprise: I. In Berkeley, colleges of letters, social sciences, natural sciences, agriculture, mechanics, mining, civil engineering, and chemistry. II. At Mt. Hamilton, the Lick astronomical department (Lick observatory). III. In San Francisco, colleges of art, law, medicine, dentistry, pharmacy, and veterinary science. There are also graduate courses. Women are admitted on equal terms with men.

The University's endowment in 1897 was capitalized at about \$8,900,000; its income for 1895-96 was \$286,000; it has assurance of several millions more, to become available when permanent building plans, already well advanced, shall have been matured. The univ. is entitled to the avails of the public lands given to the state for an agricultural coll. by the act of congress of 1862. Tuition is free in the univ. proper, but not in the professional departments, excepting that of law. Professors and instructors, 1896-97, 240; students, 2200; Martin Kellogg, LL.D., president.

**CALIGULA, CAIUS CESAR AUGUSTUS GERMANICUS, Roman emperor** (37-41 A.D.), the youngest son of Germanicus (nephew of Tiberius) by Agrippina, was b. 31st Aug., 12 A.D., at Antium, and was educated in the camp, where the soldiers gave him the by-name C., from the half-boots (*caligæ*) which he wore. On the death of his brother

Drusus, he was made augur in his stead; and on the death of Tiberius (37 A.D.), who, it was suspected, had received foul-play at his hands, it was found that he had been appointed co-heir along with the grandson of Tiberius, but the senate and the people allowed C. supreme and sole authority. In the beginning of his reign, he appeared hardly likely to fulfill the threat of Tiberius, who had talked of educating C. "for the destruction of the Roman people." He was, to appearance, lavishly generous and merciful, pardoning even those who had been the instruments of cruelty against his own family. But this ostentatious magnanimity was itself a disease, an unwholesome affectation, founded on no principle, or even humanity of heart, and co-existed with the most savage voluptuousness and lust. Consequently, when illness, the result of his vicious life, had weakened his faculties, the lower qualities of his nature obtained the complete mastery. In addition to the senseless prodigality with which he commenced his career—expending in one year the enormous wealth left by Tiberius (720 millions of sesterces)—he began to manifest the most barbarous propensities. He banished or murdered his relatives, excepting his uncle Claudius and sister Drusilla (with whom he carried on incestuous intercourse); filled Rome with executions, confiscating the estates of his victims; amused himself, while dining, by having victims tortured and slain in his presence; and uttered the wish "that all the Roman people had but one neck, so that he might decapitate Rome at a blow!" To vie with Xerxes, he made a bridge of ships over the bay between Baiæ and Puteoli (a distance of three Roman miles and 600 paces), and celebrated the exploit by a costly banquet on the middle of the bridge, and by collecting on it great numbers of people, and causing them to be drowned. His favorite horse was stabled in a palace, fed at a marble manger with gilded oats, was made a member of the college of priests, and afterwards raised to the consulship. As a climax to all his absurdities, he declared himself a god, and had temples erected, and sacrifices offered to himself. At length a conspiracy was formed, and he was assassinated 41 A.D.

**CALIPASH**, the name given by epicures to that part of the turtle that adheres to the upper shell, and is of a greenish color. The corresponding flesh next to the lower shell is of a light yellow, and receives the name *calipee*.

**CALIPH** (Turk., a successor), the title of Mohammed's successors in temporal and spiritual power, from which the historians of the middle ages designated the Arab empire founded by these princes the **CALIPHATE**. This empire, for two or three centuries, exceeded even the Roman empire in extent. As Mohammed died without leaving any sons, a contest arose concerning the inheritance of his power, which terminated (632 A.D.) in the triumph of Abubekr (q.v.), one of his fathers-in-law, over Ali, his nephew and son-in-law. Abubekr now assumed the title of Caliphet-Resul-Allah—i.e., representative or deputy of the prophet of God. He sent forth his armies for the extension of Mohammedanism, and after several victories over the forces of the Byzantine empire, conquered Syria. He was succeeded in 634 by Omar, another father-in-law of Mohammed, by whom Egypt and Jerusalem were annexed to the caliphate. He assumed the title of Emir-al-Mumenin—i.e., prince of the faithful—a title which all subsequent caliphs retained. Othman, a son-in-law of the prophet, was the third C., and was elected by six persons appointed by Omar before his death. During his reign (644–66 A.D.), the Arabian empire grew with extraordinary rapidity, being extended into Persia, and westward along the n. coast of Africa as far as Ceuta. The Byzantine emperors recovered Egypt; but it was wrested from them again at a prodigious expense of blood. The people of Medina elected Ali-ben-Abi-Taleb as C. upon the death of Othman. The Shiites regard him as the first true imam or high-priest, and honor him and his son Hassan almost equally with Mohammed himself. Contests against rivals prevented him from doing much for the extension of the caliphate. Moawijah, the governor of Damascus, having made himself really independent during Ali's life, and having extended his power over Syria, Egypt, and part of Arabia, became C. in 661, and founded the dynasty of the Ommiades, making the caliphate hereditary. He removed the seat of the caliphate to Damascus. His armies ravaged Asia Minor, and laid siege to Constantinople, but could not take it. He made important conquests, however, in Central Asia. The caliphate did not remain long in the family of Moawijah, and it frequently happened that in one or other of the subject countries a governor raised himself to a temporary independence; and rival caliphs frequently contended for power. Abd-melek (685–705 A.D.) united all the Moslems under his dominion. Under his son, Walid I., the caliphate reached its zenith of prosperity, the Arabs conquering Turkestan in 707, Galatia in 710, and Spain in 711. Under Hesham, the progress of the Arabs in the west was arrested by Charles Martel at Tours (732 A.D.), and at Narbonne (736 A.D.). The dynasty of the Ommiades in Asia terminated with Merwan II. in 752, giving place to that of the Abbasides. But a branch of the Ommiades founded an independent caliphate at Cordova, and another founded one in Arabia, which subsisted till the 16th century. Abul-Abbas (750–54 A.D.), the first Abbaside C., signalized himself by his cruelty and the torrents of human blood which he shed. His successor, Abu-Jafar, called Al-Mansur, a patron of the arts, but a persecutor of Christians, founded Bagdad (q.v.), and removed the seat of the caliphate thither. From the beginning of the 9th c., the Arab empire, which had suffered much from corruption and internal disorganization

under the last caliphs of the Omniade dynasty, and had never completely recovered, showed increased signs of decay. Even under the C. Harun-al-Raschid, whose praises the eastern poets were accustomed so much to celebrate, independent kingdoms were established (800 A.D.) by the Aghlabides in Tunis, and the Edrisides in Fez. In 821, Taher, the governor of Khorassan, made himself independent, and established a dynasty there, and other governors of provinces followed his example. But, under the C. Al-Mamun, the Arabians conquered Sicily and Sardinia, the former of which they held till it was taken from them in 1035 by the Normans; and the latter, till it was conquered by the Pisans in 1051. The C. Motassem (838-42 A.D.) was the first to employ Turkish soldiers; but the practice was followed by his successors; and the Turkish body-guard soon became a formidable power in the caliphate, and about the middle of the 9th c. assumed the right of deciding the succession to the throne. Many of the caliphs, meanwhile, were base voluptuaries, and of the others, some were of little capacity, and their power rapidly declined. Ere the middle of the 10th c., the caliphs themselves exercised a mere nominal sovereignty, whilst the emirs, like the mayors of the palace towards the close of the Merovingian dynasty among the Franks, possessed all real power. The princes of the Fatimide dynasty, which succeeded that of the Aghlabides in Tunis, having made themselves masters of Egypt in 970, assumed the title of C., so that there were now three caliphates—at Bagdad, at Cairo, and at Cordova. In the 11th c., the caliphs of Bagdad were still acknowledged as the spiritual chiefs of all the Moslems; but their temporal power scarcely extended beyond the walls of Bagdad. Bagdad itself became the prey of a Mongol horde in 1258, and the representative of the caliphs fled to Egypt, where, under the protection of the Mamelukes, who had made themselves masters of that country in 1250, he retained his title and spiritual power, which he transmitted to his successors, who continued to reside there till the Turks conquered Egypt in 1517, when the last of them was carried to Constantinople; and since that time the Turkish sultans have assumed the title of C., and claimed to be regarded as the spiritual chiefs of all the Moslems, a claim to which little respect has ever been paid except within the limits of their own empire.

**CALLIPPIC CYCLE.** See PERIOD.

**CALLIPPUS**, or **CALLIPPUS**, an astronomer of Greece, in the 4th c., B.C. He corrected earlier measurements of time by Meton's cycle of 19 years, which he found to be six hours too long. He made the year 365½ days.

**CALISAYA BARK.** See PERUVIAN BARK; CINCHONA.

**CALLISTHENES**, physical exercise designed to promote strength and proper bodily development. The usual apparatus includes a pair of light dumb-bells, Indian clubs, stout wooden rings, a wooden staff about 4 ft. long, horizontal bars, bags of beans for throwing and catching, and two weights running upon vertical cords. The practice of callisthenics is growing among schools for girls.

**CALITRE**, a t. of Italy, in the province of Avellino, near the Ofanto, and about 7 m. e.n.e. of Conza. It has a pop. of 6000, who are chiefly engaged in agricultural pursuits. Sheep are reared to a considerable extent in the vicinity.

**CALIVER** was a matchlock or fire-arm about midway in size and character between an arquebuse and a musket; it was small enough to be fired without a rest or support.

**CALIXTINES**, a Bohemian religious sect, so named from the Latin *calix*, a cup, because they contended for giving the cup, as well as the consecrated wafer, to the laity. Their confession of faith (1421) contained the following articles: 1. That the word of God ought to be freely and regularly preached by the priests of the Lord throughout Bohemia; 2. That the eucharist in both kinds ought to be administered to all burdened with "no mortal sins," according to the language and command of the Savior; 3. That the clergy should separate themselves from secular affairs; 4. That all "mortal sins," and especially public ones, such as debauchery and simony, and any other disorders contrary to the law of God, should be prevented or punished by those who were the lawful authorities in such matters. In other main points they were moderate followers of John Huss, and were opposed to the more extreme sect of Taborites (q.v.). Their peculiar articles of faith were conceded by order of the council at Basel (1433); and having prevailed over the Taborites in the conflict which took place at Boehmischbrod, 30th May, 1434, they became the dominant party in Bohemia, and exercised considerable influence over political affairs. Gradually, however, the C. lapsed from the severity of their four articles, while the schism of the energetic Taborites, and later of the Bohemian brethren (q.v.), rendered them completely powerless.

**CALIXTUS**, a name borne by three popes. The first was born a slave, and is said to have suffered martyrdom, 238 A.D. The second (d. 1124) was a son of the count of Burgundy, and a ruler of firmness. He expelled the anti-pope Gregory from Rome in 1120, stormed the castle in which he took refuge, and made him a prisoner. He also concluded with Henry V., of Germany, the famous Concordat of Worms (1122) by which the long dispute over the question of investiture (q.v.) was compromised. The third was of the Spanish Borgia family, and his leading idea was to institute a great crusade against the Turks, in which he failed. He died in 1458, and was succeeded by Alexander VI., one of the most celebrated of the Borgia family.

**CALIXTUS**, GEORG (properly, *Callisen*), an eminent theologian of the Lutheran church, was born 14th Dec., 1586, at Medelbye in Schleswig; studied at Flensburg and Helmstedt; and, in 1605, became professor of philosophy in the latter of these cities. Two years after, he betook himself to theology, and attracted great attention by the breadth and originality of his views. After traveling for some time in Germany, Holland, England, and France, where he made the acquaintance of the most learned men of his time, he returned to Helmstedt in 1614, and was appointed professor of theology. His genius, the depth of his knowledge, and his large experience of the world and of men, which he had acquired in his travels, developed in him a spirit of great tolerance towards all who held their religious opinions honestly, whatever these might be. Although his dissertations on the Holy Scripture, transubstantiation, communion in one kind, etc., are acknowledged by learned Catholics to be about the most solid and admirable which have been composed by Protestants against the distinctive doctrines of Catholicism, he was, on account of some statements in his work, entitled *De Præcipuis Religionis Christianæ Capitibus* (Helmstedt, 1618), which seemed favorable to Catholic dogmas, and of others in his *Epitome Theologiæ Moralis* (Helmstedt, 1634), *De Tolerantia Reformationum*, etc. (Helmstedt, 1658), which approached too near to the Reformed or Calvinistic standpoint, declared guilty of abominable heresy by the adherents of the letter of the Concorde-formel—i.e., the orthodox and dogmatically rigid Lutherans. C. felt keenly that the polemical harshness of Lutheranism was a serious obstacle in the way of a great Catholic Christianity, and that Protestantism must assume another form before it could hope to become the religion of Europe. Under this conviction, B. endeavored to show that the oldest and most fundamental articles of the Christian faith—viz., the facts embodied in the "Apostles' Creed"—were common to all Christian sects. In subsequent dissertations, having stated that the doctrine of the Trinity was less distinctly taught in the Old than in the New Testament, and that good works were necessary to salvation; and finally, at the religious conference of Thorn, in 1649, whither he was sent as a mediator by the elector of Brandenburg, having been on more intimate terms with the Calvinistic than the Lutheran theologians, C. was accused of apostasy. Fortunately, however, he had powerful friends, who stood firmly by him, and through their help he was enabled to retain his professorial chair till his death, on 19th Mar., 1656.

**CALL**, WILKINSON, b. Ky., 1834; became a lawyer; was elected to the U. S. senate, after the war, but was not allowed to take his seat; elected to the U. S. senate as a Dem., 1879, and continuously re-elected, 1885, 1891, from the state of Florida.

**CALL**, a term often used in reference to various theological and ecclesiastical subjects.—1. The command or invitation to believe in Jesus Christ, is designated the *call of God*, or the *gospel call*. Calvinistic theologians make a distinction between a *general call* and a *special or effectual call*. The former is addressed, they say, to all to whom the word of God comes; but it is insufficient of itself to induce any man to the act of faith, and requires, in order to its efficacy, that it be accompanied by the special and irresistible grace of the Holy Spirit. They are careful, however, to state that the general or outward calling by the word always precedes and accompanies the special and effectual calling by the Spirit. The notion of an inward call by the Spirit of God in the soul, unconnected with outward calling by the word, belongs not to Calvinistic, but to mystic theology.—2. A call to office in the church, and particularly to the ministry of the gospel, is regarded by Christians generally as proceeding from God; and the church of England requires of candidates for ordination an express profession that they trust they are so moved of the Holy Ghost.—3. A call by the people who are to be under the pastoral care of a minister has been generally regarded in the Christian church as necessary to the establishment of the pastoral relation. But there have been great differences of opinion as to what constitutes a sufficient call, and great differences of practice with regard to it. Some of the principal ecclesiastical dissensions in Scotland have had their origin in this question. The election of a pastor by the *Christian people* of his *parish* or *congregation*, has been contended for by many as the true call, or the best kind of it; others, approving of patronage with certain limitations, contended no less earnestly for the right of the people to be consulted, so that without their concurring by a call, the patron's presentee should not be held entitled to be inducted into the pastoral office; and according to the practice of the church of Scotland, this concurrence was always at least formally sought. Questions concerning the call and its proper value, supposed to have been determined by the earl of Aberdeen's act, passed when the *disruption* of the church of Scotland took place in 1843, were not finally settled until 1874.

**CALL**, a stipulated sum to be paid towards a share in a joint-stock undertaking. For example, in a \$50 share, there are usually at least four calls of \$12.50 each, the calls being made at intervals of not less than three months.

**CALL**, a military musical term meaning a signal on the trumpet.

**CALL** is a metal whistle used by the boatswain and his mate on shipboard. Various strains or kinds of sound produced denote signals or orders for hoisting, heaving, lowering, veering, belaying, letting-go, etc. These sounds are as much attended to by seamen, as those of the drum, bugle, and trumpet are by soldiers. At one time, a gold call, with a chain, used to be the badge of an admiral.

**CALLA**, a genus of plants of the natural order *araceæ*, or, according to some botanists, of the natural order *orontiaceæ*, which is distinguished from *araceæ* only by having hermaphrodite flowers. The genus *calla* is characterized by a flat spathe (q. v.) within which is a cylindrical spadix (see *SPATHE*) covered with naked flowers, appearing as a mere mixture of stamens and pistils, and a one-celled ovary with 6 to 8 erect ovules. The known species are few and natives of very different climates. *C. Palustris* is found in swamps in Europe, Siberia, and North America, but not in Britain. It has a creeping root-stock, and heart-shaped, stalked leaves, the midrib of which is prolonged beyond the blade into a point; the spathe is white, and the spadix yellow. The root-stock is extremely acrid and caustic; but, being deprived of its acridity by grinding, boiling, and macerating, is made by the Laplanders into a kind of bread called *missbroed*, which they hold in high estimation.—The well-known and beautiful *Richardia Ethiopica* was formerly included in this genus, and is often still called *calla*.

**CALLAHAN**, a co. in n. w. Texas; on the Texas and Pacific railroad; 900 sq. miles. It has a rocky and broken surface, but good for grazing. Pop. '90, 5434. Co. seat, Baird.

**CALLANDEB**, a village in Perthshire, on the left bank of the Teith, 17 m. n.w. of Stirling. It lies in a beautiful and romantic situation, surrounded by high mountains and Highland lakes. Hence it is much frequented by tourists, who make this place a center to visit Benledi, the Trosachs, the Bracklin falls, and Lochs Lubnaig, Vennachar, Achray, and Katrine. Pop. in '91, less than 2000.

**CALLAO**, the port of Lima, the capital of Peru, connected with that city by a railway of 6 m. in length. It stands in lat. 12° s., and long. 77° 18' w. Fine harbor-works, with extensive pier and dock accommodation, were completed in 1875. The roadstead is large, free from rocks, and safe, being sheltered by the island of San Lorenzo. The exports are guano, specie, copper, cotton, bark, and hides. C. contained (1890) 35,500 inhabitants. The present C. dates only from 1746, when the original city was submerged and destroyed by an earthquake.

**CALLAWAY**, a co. in e. Missouri, on the Missouri river; 760 sq. m.; pop. '90, 25,181, includ. colored. The soil is mainly prairie, and fertile, producing corn, tobacco, potatoes, butter, wool, etc. Co. seat, Fulton.

**CALLOWAY**, a co. in s.w. Kentucky, on Tennessee river; 434 sq. m.; pop. '70, 9410—812 colored; in '90, 14,675. The surface is varied, and soil fertile, producing corn, tobacco, etc. Co. seat, Murray.

**CALL CHANGES**. See *BELLS*.

**CALLCOTT**, Sir AUGUSTUS WALL, B.A., a distinguished English landscape painter, was b. at Kensington, London, in 1779. In 1803, he devoted himself to landscape painting; in 1810, he was made a member of the royal academy; was knighted in 1837; and in 1844 made conservator of royal pictures. His landscapes are remarkable for their beauty, clear definition of objects, good drawing, and truthful natural coloring. He has been called the English Claude, a designation to which he is not altogether unentitled. He died Nov., 1844.

**CALLCOTT**, JOHN WALL, a distinguished musical composer, elder brother of the above, was b. at Kensington, 1766. Too nervous to be a surgeon, for which he was intended, he devoted his attention to music, and in 1785 won three of the four gold medals annually given by the Catch club, the admired *O Sovereign of the Willing Soul* being one of the successful pieces. During the next ten years, he obtained twenty of the medals given by the same society. In 1785 he was made bachelor, and five years afterwards doctor of music at Oxford. In 1806, he published his *Musical Grammar*; in the following year his mind gave way under the continuous strain to which it had been subject. He recovered again, but only for three years, when he relapsed, and continued insane until his death in May, 1821. He was one of the most eminent composers belonging to the British school of music, and especially celebrated for his glee compositions. His choicest productions were published in two volumes by his son-in-law, Mr. Horsley, in 1824.

**CALLEJA**, Don FELIX DEL REY, 1750-1820; count of Caldron, commanding the Spanish forces in Mexico during the Hidalgo insurrection. In Jan., 1812, he captured the fortress of Zitacuaro and murdered all the inhabitants; and in the same year he captured Hidalgo's successor, the priest Morelos, who was at once shot. For these acts he was made viceroy and ennobled.

**CALLERNISH**, or *CALLANISH*, a district on the w. coast of the island of Lewis, about 16 m. from Stornoway, remarkable for its circles of standing stones (q. v.). There are four circles, at no great distance from one another, but without any visible relation. The principal one is of a more than usually elaborate design.

**CALL OF THE HOUSE** is an imperative summons to every member of parliament of either house on some particular occasion, when the sense of the whole house is deemed necessary. In the *house of lords*, when any urgent business is deemed to require the attendance of the lords, it has been usual to order the house to be called over; and this order has sometimes been enforced by fines and imprisonment upon absent lords. On some occasions, the lord chancellor has addressed letters to all the peers, desiring their

attendance, as on the illness of George III., 1st Nov., 1810. The most important occasion on which the house was called over, in modern times, was in 1820, for the trial of queen Caroline.

When the *house of commons* is ordered to be called over, it is usual to name a day which will enable the members to attend from all parts of the country. The interval between the order and the call has varied from one day to six weeks. If it be really intended to enforce the call, not less than a week or ten days should intervene between the order and the day named for the call. The order for the house to be called over is always accompanied by a resolution "that such members as shall not then attend, be sent for, in custody of the sergeant-at-arms." And it was formerly the custom to desire the speaker to write to all the sheriffs to summon the members to attend. On the day appointed for the call, the order of the day is read and proceeded with, postponed, or discharged, at the pleasure of the house. If proceeded with, the names are called over, according to the counties, which are arranged alphabetically. The members of a county are called first, and then the members for every city or borough within that county. The counties in England and Wales are called first, and those of Scotland and Ireland in their order. This point is mentioned, because it makes a material difference in the time at which a member is required to be in his place.—See *May's Proceed. in Parl., on Attendance of Members.*

**CALL TO THE BAR** is the formal expression by which the admission of law-students to the rights and privileges of legal practice in America, England, and Ireland is publicly announced. In Scotland the corresponding expression is *Passing Advocate*. See **ADVOCATE**; **ATTORNEY**; **BARRISTER**; **INNS OF COURT**.

**CALLIOTHEYS** (Gr. *kalos*, beautiful, *ichthys*, a fish), a genus of fishes of the family *silurids* (q.v.), having the body almost entirely covered by four rows of large, hard, narrow, scaly plates, two rows on each side. The head is also protected by a sort of helmet. The mouth is small, the teeth very small; two long barbules hang from each angle of the mouth. The species of this genus are natives of warm climates, particularly of South America. They are interesting because, when the streams or pools which they inhabit dry up, they make their way across the land to some other piece of water, even although at a considerable distance. They also sometimes bury themselves in the mud of wet meadows, out of which they are digged. They have no special organs for carrying a supply of water with them, like the climbing perch, but are supposed to retain a little between the plates of their body. A still more interesting part of the natural history of these fishes is their making regular nests, generally of leaves, in which they deposit their eggs, near the margin of the water, at the beginning of the rainy season, the male and female uniting in watching them until they are hatched. These habits are shared by the species of the allied genus *doras*, in which the lateral plates are broader, keeled, and each ending in a spine.

**CALLICRATES**, a Greek architect in the 5th c., B.C., who, assisted by Ictinus, was the builder of the Parthenon.

**CALLICRATIDAS**, the successor of Lysander in command of the Lacedemonian fleet against the Athenians, 406 B.C. After two successful battles he was defeated in a third, thrown overboard, and drowned.

**CALLIÈRES BONNÈVEUE**, LOUIS HECTOR, Chevalier de, 1639-1708; a French army officer, governor of Montreal in 1684, and in 1687 leader of the advance of the forces invading the lands of the six nations in New York. He visited France to urge the seizure of the city of New York as a security for French supremacy in Canada. In 1699, he was made governor-general of Canada.

**CALLIGONUM**, a genus of plants of the natural order *polygonæ* (q.v.), having a quadrangular fruit (*achenium*, q.v.), winged at the angles. The best known species is *C. pallasia*, a succulent shrub found on the sandy steppes near the Caspian sea, and in the lower part of the basin of the Volga, where its acid fruit and its also acid shoots often serve to allay the thirst of the Kalmucks and of weary travelers. Its root strikes deep into the sand, is swollen at its upper part, and when cut there, gives out a nutritious gum resembling tragacanth, which is also obtained by pounding and boiling it, and on which the Kalmucks feed in times of scarcity.

**CALLIMACHUS**, an eminent poet, grammarian, and critic of the Alexandrian period, flourished about the middle of the 3d c. B.C. He was of a distinguished family at Cyrene, in Libya; taught grammar and belles-lettres in Alexandria; was a favorite of Ptolemy Philadelphus, and his successor Ptolemy Euergetes; and was made principal librarian of the Alexandrian library. He wrote many works on the most various subjects (Suidas mentions 800), but only fragments are extant; nor have we many of his poems; but the poems which we have, bear the marks of an age when the artificial had obtained a preference over the natural. See the ed. of Wilamowitz (1882).

**CALLIMACHUS**, an architect and artist of Greece, who lived about 400 B.C., and is said to have been the originator of the Corinthian column.

**CALLING THE DIET** is the Scotch term for *arraignment* (q.v.), although the forms are different. In Scotland, excepting in cases of high treason, there is no grand jury, but the procedure is briefly as follows: Before a prisoner can be tried, a written or printed

copy of the indictment preferred against him must have been served 15 days before the trial, with a copy of the list of witnesses to be examined against him, and also of the jury panel. When, therefore, he is placed at the bar of the court, and called on to plead, he is presumed to know the nature of the charge made against him. But if it be desired by him, or by his counsel, the clerk in the first instance reads the indictment aloud in open court—the same being a well-prepared syllogistic statement of the facts, which the prosecutor is prepared to prove. He is then called upon to state his objections to the relevancy, and to have such relevancy disposed of by the court, before being called on to plead to the fact. If the judgment of the court is in favor of the objection, the prosecution for the time fails, and the prisoner is sent back to jail, to abide another indictment, unless the prosecutor chooses to abandon the case against him altogether. See INDICTMENT; VERDICT.

**CALLINUS** of **EPHESUS**, reputed to have been the earliest of the Greek poets, lived about 700 B.C. One of his elegies has been preserved to the present time.

**CALLIONYMUS**. See **DRAGONET**.

**CALLIOPE** (i.e., the sweet-voiced), was, according to the ancients, the first of the **Muses** (q.v.), and presided over epic poetry, or over poetry in general. She was said to be the mother of **Orpheus**, of the **Sirens**, etc. She was usually represented with a style and wax tablets.

**CALLIOPE**. See **MUSICAL INSTRUMENTS**.

**CALLIPERS**, a kind of compasses with curved legs, used by turners and other workmen for measuring the diameters of cylindrical, spherical, and other curved work. The C. are laid over the work, and opened or closed until both points just touch the periphery; then the C. are laid upon a rule, and the extent of their opening measured, or the size is compared with a pattern.

**CALLIRHOË**, a fountain near **Athens**, called the fountain of nine springs, because its waters were distributed in that number of channels.

**CALLISTEIA**, a Grecian festival at which a prize was awarded to the most beautiful woman. But among the **Elians** men were the competitors, and the victor received a suit of armor which he dedicated to **Minerva**.

**CALLISTHENES**, of **Olynthus**, was the son of **Hero**, a cousin of **Aristotle**. C. was b. about 360 B.C.; he was educated by **Aristotle** along with **Alexander the great**. He devoted himself to the study of natural and political history, and accompanied **Alexander the great** in his expedition to **India**. He incurred the displeasure of the courtiers and royal favorites, and of **Alexander** himself, who was displeased by his remonstrating against his intended assumption of divine honors, and in general by his bold, indiscreet, outspoken ways; and he was put to death on a pretended charge of treason, 328 B.C. Only a few fragments of his historic works remain, and these are not valuable. The *History of Alexander* ascribed to him, of which there are several MSS. in the **Paris Library**, is evidently a production of the 7th c., and rather a romance than a history.

**CALLISTRATUS**, an orator of **Athens** whose eloquence led **Demosthenes** to devote himself to public speaking. For surrendering **Oropus** (after a heroic defense) to the **Thebans**, he was condemned to death, 361 B.C., but he fled to **Macedonia**, where he founded the city of **Datum**, afterwards called **Philippi**. At a later period he returned to **Athens** and was put to death.

**CALLISTO** (also written **CALLISTO**), an **Arcadian** maiden, the attendant upon **Diana**. **Zeus** having conceived a passion for her, took the form of **Diana**, and accompanying **Callisto** to the chase, overcame her virtue. One day when bathing, her condition became apparent to **Diana**, who in anger changed **Callisto** into the shape of a bear. **Zeus** subsequently placed her in the sky in the form of a constellation, since known as the **Bear**.

**CAL'LITHRIX**. See **SAGOUIN**.

**CAL'LITRIS**. See **SANDARACH**.

**CALLOSITIES**. See **CORNS**.

**CALLOT**, **JACQUES**, one of the most eminent artists of his time, was b. at **Nancy**, 1592. Proceeding to **Rome**, he commenced drawing and engraving under **Thomassin** in his eighteenth year. He next went to **Florence**, where, by numerous spirited etchings, he gained great fame, and engraved for **Cosmo II.**, grand duke of **Tuscany**, a series of plates of court-festivals, etc. When his patron died (1621), C. returned to his native place, and increased his reputation by a copious series of etchings, including six plates of the siege of **Brda**. By order of **Louis XIII.**, who invited C. to **Paris**, etchings of the sieges of **Rochelle** and the **Ile Rhé** were executed; but C. refused to commemorate by art the capture of his native town, and, declining the pension offered by the king, returned to **Nancy**, where he died, 1635. His activity as an artist was marvelous. Of his engravings, 1600 are still preserved at **Dresden**. As helps to a vivid conception of the manners, conditions of life, events, etc., in the 17th c., they are invaluable. C.'s *Misères de la Guerre*, a series of 18 plates, are especially celebrated. See works on **Callot**, by **Meaume** (2 vols., **Nancy**, 1860), **Dumast** (**Nancy**, 1875), **Houssaye** (**Paris**, 1875), and **Thausing** (**Vienna**, 1881).



**CALLUNA.** See **HEATH.**

**CALLUS.** This term was employed in old surgical works, and is still used popularly, to indicate the exuded material by which fractures of bones are consolidated together. If the broken ends are accurately adjusted to each other, there is no projection of C., but merely a slight deposition of it between the two surfaces; if, however, the adjustment is not accurate, the C. is effused in such quantity as to fill up any interspaces that may exist, and as often to form a considerable hard swelling round the seat of the fracture; any excess is, however, usually absorbed during the last stage of the repair of a fracture. When the broken ends are allowed to move upon each other—which, of course, should be always prevented, if possible—a ferule of new bone, encircling both fragments for some little distance, so as to splice them together, till they are united by a permanent C., is formed; this is termed a *provisional callus*.

**CALMAR.** See **KALMAR.**

**CALMET,** AUGUSTINE, an exegetical and historical writer, and learned Benedictine, was b. at Mesnil-la-Horgue, near Commercy, Feb. 26, 1672, and, in 1699, entered the order of Benedictines. In 1698, he was appointed teacher of philosophy and theology in the abbey Moven-Moutier; in 1704, sub-prior of a convent of learned monks at Münster, in Alsace; and in 1706, he went to Paris, to superintend the publication of his *Commentary on the Bible*. He was afterwards appointed prior at Lay (1715), abbot of St. Leopold (1718), abbot of Senones in Lorraine (1728), and died at Paris, Oct. 25, 1757. His exegetical writings have been commended and studied with advantage by both Roman Catholics and Protestants. The *Commentary on the Bible* (23 vols., Paris, 1707–16), though marked by the author's deficient knowledge of the oriental languages, contains valuable researches in biblical antiquities. C.'s *Historical and Critical Dictionary of the Bible* (4 vols., Paris, 1722–28) was translated into English, German, and other languages, and has passed through many editions. His other works—a *History of the Bible*, and of the Jews (1718), and a *Universal History* (1735–71)—are mere compilations; but his *History of Lorraine* is founded on original researches. Solid criticism and vigorous intellect are wanting in all his works.

**CALMS,** or **CALM LATITUDES,** are those parts of the ocean, near the equator, which are subject to total absence of wind for long periods together. The part of the ocean where C. are most looked for, is between the region of the trade-winds and that of the variable winds. See **WIND**. It is almost as much dreaded by seamen as a region of storms, for the ships is unnavigable; and during a calm of many weeks, food and water may be nearly exhausted, at a point too far from land for boats to reach it. Where a calm occurs unexpectedly, it is likely to be followed by violent storms.

**CALMUCKS.** See **KALMUCKS.**

**CALNE,** a parliamentary borough and ancient t. of Wiltshire, on the river Marden, 31 m. n.n.w. of Salisbury. It lies in one of the many valleys of the chalk escarpment of this part of England, with the plateau of the Marlborough downs and Salisbury plain on the e. and south. In 1868, a branch line was opened to C., 6 m. from the Chippenham station of the Great Western railway. The principal industry is the curing of bacon. The manufacture of woollens, formerly of importance, is now extinct. There is also a weekly corn-market. The town contains a technical art school. Pop. of the town in 1891, 3495. The parliamentary borough, formerly returning two members to parliament, but now only one, includes part of Blackland and Calstone. Many Roman remains have been found here. The West-Saxon kings had a palace at Calne, but no traces of it now remain. At a synod held here by St. Dunstan in 977, relative to the celibacy of the clergy, the floor of the room in which the synod sat gave way, precipitating all to the ground but St. Dunstan, who presided. On an almost perpendicular declivity 3 m. e. of C. is the figure of a horse, 157 ft. long, in a spirited attitude. It was cut out in white chalky ground in 1780 by Dr. Allsopp, and is visible 50 m. off. Dr. Priestley resided at C. 1770–80.

**CALO'EE.** See **BOEHMERIA.**

**CALOMARDE,** DON FRANCISCO TADEO, Count, a Spanish statesman, was b. in 1775 at Vilel, in Aragon. He studied at Saragossa, where he passed as an advocate. After the expulsion of the French, and the return of Ferdinand VII. in 1814, C. was among the first to hurry to Aragon, and do homage to him as an absolute monarch. As a reward of his obsequious celerity, he obtained the highest office in the *secretaria general de Indias*, but lost it on account of accepting a bribe. On the restoration of the constitution in 1820, he unsuccessfully courted the favor of the liberals; but when the French army in 1823 enabled the king once more to rule despotically, C. was appointed secretary of the *cdmara del real patronato*, one of the most influential offices in the kingdom. Not long after, the king made him minister of justice. While he held this function, he persecuted the liberals with cold-blooded savageness, recalled the Jesuits, re-opened the monasteries, and closed the universities. He also secretly favored the party of Don Carlos; but, on the other hand, by treating any unseasonable outbreak with a strictness bordering on cruelty, he preserved himself from the suspicion of being implicated in their schemes. In 1833, when Ferdinand was supposed to be on his death-bed, he was prevailed on by C. to re-introduce the Salic law, by which Christina

was excluded from the throne, and Don Carlos, the favorite of the absolutists, appointed his successor. This excited the hatred of the nation; and Ferdinand recovering, abolished the law. To avoid imprisonment, C. fled to France. He died at Toulouse in 1842.

**CALOMEL** is the popular name given to one of the compounds of mercury, Hg, and chlorine, Cl, and known to scientific chemists as the subchloride of mercury,  $\text{Hg}_2\text{Cl}_2$ . It is prepared by taking two equal portions of mercury, dissolving one portion in hot concentrated sulphuric acid,  $\text{H}_2\text{SO}_4$ , which forms sulphate of mercury,  $\text{HgSO}_4$ , thereafter adding the second part of the metal, and triturating the whole in a mortar till the metal becomes incorporated with the sulphate of mercury. This mixture is then added to one half its weight of common salt, NaCl, and heated in a retort, when C. sublimates, and condenses in the cool part of the receiver, as a fine white powder. A minute portion of corrosive sublimate which accompanies it, is removed by washing with water. C. is very dense. It is not soluble in water, and sparingly so in acids. It turns black on the addition of lime-water, potash, soda, or ammonia; and when heated in an iron spoon, or on a knife, it does not char, but rises in vapor, sublimates unaltered, and readily condenses again on any cool surface held near it. Although C. has been more used in general practice than any other preparation of mercury, it is not known to have been employed before the 17th century. Its medicinal virtues will be treated of with the other mercurials. See MERCURY.

**CALONNE**, CHARLES ALEXANDRE DE, controller general of finance in France under Louis XVI., was b. Jan. 20, 1734, at Douay. Possessing superior abilities, he studied law, and having filled successively various offices, was made, in 1783, controller general of the treasury. In this capacity he soon gained favor among the courtiers, who had complained of the parsimony of Turgot and Necker. C., though he found French finance in a deplorable state, was determined not to seem poor, gave brilliant entertainments, paid off the debts of his patron the count of Artois, supplied the queen with sufficient pocket-money, granted pensions and gratuities to his supporters and favorites, paid off arrears, and purchased the residences of St. Cloud and Rambouillet! His means of raising money were perfectly simple—he borrowed, anticipated, issued chancery-edicts, and prolonged and augmented extraordinary taxations in a style never known before. The parliament resisted these measures, but C., backed by royal authority, carried them into execution. The crisis necessarily arrived; and in 1786, when the people could bear the extraordinary taxation no longer, C. advised the king to convoke the assembly of the notables, and proposed to abolish the privileges (exemption from taxes) of the noble and wealthy, to take the duty off salt, to abolish *socage* (feudal or compulsory service to the lord of the manor), and to distribute the burden of taxation more equally. The people and the aristocracy demanded a convocation of the states-general, instead of the assembly of the notables; but C. boldly proceeded with his plan, opened the assembly of the notables, Feb. 2, 1787, and in a pleasant and florid oration, described the general prosperity of French industry and commerce and brought his speech to a climax by confessing that the annual deficit of the treasury had risen to 115 millions of francs, and that during the time from 1776 to 1786, the government had borrowed no less a sum than about 1250 millions! The notables, instead of proceeding with C.'s plan of reorganization, demanded from him a statement of accounts. Not being able to give this satisfactorily, he was stripped of his dignities, and banished to Lorraine. After this, C. resided chiefly in England, until in 1803 he obtained from Bonaparte permission to return to France, where he died, in very embarrassed circumstances, Oct. 30, 1802.

**CALOPHYLLUM** (Gr. beautiful leaf), a genus of trees of the natural order *guttifera* (q.v.), natives of warm climates. Some of the species yield valuable timber, as *C. angustifolium*, the PINEY TREE, which grows at Penang, and in the islands to the eastward of the bay of Bengal, and furnishes the beautiful straight spars called *poon*. The resinous products of some species are valuable, and among them are some of the substances known by the name of *tacamahaca* (q.v.). *C. inophyllum*, which yields true East Indian *tacamahaca*, is a very large and beautiful umbrageous tree, often planted for its shade and the fragrance of its flowers, which are white and in loose axillary racemes. It is one of the most valuable timber-trees of the South Sea islands. The timber resembles mahogany, being of equally close texture, although of lighter color, and very durable. The leaves are oblong and obtuse; the fruit—which in all this genus is a globose drupe or stone fruit—is about the size of a walnut; and a fixed oil is expressed from its kernel, which is used for lamps, etc. A similar oil is expressed from the seed of *C. calaba*, the CALABA TREE of the West Indies, which also has white sweet-scented flowers, and of which the timber is used for various purposes, particularly for staves and cask-headings.

**CALORIC**, a term for heat (q.v.).

**CALORIC ENGINE**. This was the name given by Capt. Ericsson to his latest *air-engine*. There seems no reason for the change of name, unless it were meant to distinguish it from the previously well-known, though hitherto unsuccessful air-engines of the Messrs. Stirling. We shall in this article treat air and caloric engine as synonymous terms.

It is a well-known law, applicable to all thermo-dynamic engines, that (presupposing

the merely mechanical part of the machine to be perfect) the heat converted into work bears the same proportion to the total heat given to the fluid that the range of temperature bears to the highest *absolute* temperature of the fluid. Thus supposing an engine to receive steam \* at the temperature of 275° F., and discharge it at that of 120° F., the

fraction of heat which it can convert into work will be  $\frac{275-120}{275-461}$  or about 21 per cent

of the total heat of the fluid. This proportion would be, of course, greatly reduced in practice, owing to imperfections in the machinery, but these being equally likely to occur in all prime movers, we need not consider them here. The *lowest* limit of temperature available being practically constant, fixed either by the temperature of the atmosphere, or that obtainable in a condenser, it follows that greater economy can only be looked for in the direction of increase of initial temperature. In ordinary steam-engines, in which the pressure and temperature increase simultaneously, the latter is limited by the former, which in its turn is kept, by considerations of safety, comparatively low. When, however, *superheated* steam (steam to which additional heat has been imparted without the corresponding addition of pressure) or heated air is used, the temperature is limited only by the power of the metals composing the machine to resist the destructive action of heat, or the chemical action of the fluid at that temperature. Heated air possesses the advantage over superheated steam as a motive power, that with it an explosion, in the usual sense of the word, is rendered almost impossible, and that, if one were to occur, it would be comparatively harmless. It also, of course, enables the boiler to be dispensed with.

Air-engines, in their principal working parts, are very similar to ordinary steam-engines. The heated air is introduced into a cylinder, in which works a tightly-fitting piston, which is thus compelled to move up and down, and transfers its motion to a revolving shaft by means of a piston and connecting-rod in the usual manner. The motion of the piston results in all cases from the expansion of the heated air; the air is heated by means of a furnace, is introduced below the piston, raises it, and then is allowed to escape into the atmosphere. Air-engines are almost invariably single-acting; they are sometimes worked simply by heated air, and sometimes with the air which, having passed through the furnace, is mixed with all the gaseous products of combustion. The latter method has the immense advantage that it utilizes the heat which would otherwise be rejected into the chimney. The total efficiency of the machine is thus increased, although the efficiency of the engine proper, between the given pair of temperatures, remains the same.

The more heat carried away by the discharged air—the higher its temperature, in other words—the smaller evidently is, *ceteris paribus*, the range of temperature of the machine, and the less, therefore (as already explained), will be its efficiency. The distinctive principle of the Messrs. Stirling's air engine, as of the later C. E., consists in utilizing a great part of this wasted heat, and thus economizing fuel. This is effected by means of a "regenerator" or, more properly, "economizer," consisting of a chamber filled with metallic sieves of wire-gauze, through which the hot air is made to pass *outwards* from the cylinder, after having performed its work on the working piston of the engine. As much of the heat of the escaping air is taken up by the regenerator, and its temperature thus reduced, the range of temperature of the machine is correspondingly increased. The fresh air entering the cylinder for the next stroke was compelled to pass *inwards* through the regenerator, and abstracted from it the heat left in it. In this way it did not require to receive so much heat in the furnace as would otherwise have been the case, and thus economized fuel.

This method of preventing waste of heat was first discovered by the Rev. Dr. Stirling, who obtained a patent for it in 1816. In working with air at the ordinary pressure of the atmosphere, however, the engine was found to require to be of large dimensions as compared to a steam-engine of the same power; and in order to obviate this objection, compressed air was used, the idea originating with Mr. James Stirling, c.e. Several other difficulties were successfully surmounted by the Messrs. Stirling, and eventually two improved engines were constructed, one of which was tested to fully 40 horsepower. This latter engine did all the work of the Dundee foundry company regularly for upwards of 3 years, during which period they employed no other motor. At the end of this period it was laid aside, principally owing to the repeated failure of one of the heating vessels.

Capt. Ericsson, in his attempt to introduce his C. E. in the ship which bore his name, experienced precisely the same difficulties and disappointments, and tried nearly the same remedies as the Messrs. Stirling. There seems little doubt, however, that he actually believed his "regenerator" was to make the *same* heat do work over and over again—to be a kind of perpetual motion—and under these circumstances it is not to be wondered at that his machines (notwithstanding some not very creditable maneuvering on the part of their upholders) entirely failed, and that in 2 years (1855) they were replaced by steam-engines.

Air engines have recently been constructed, in which the solar rays, concentrated by

\* The law is the same for steam, air, or any other fluid whatever.

means of an arrangement of mirrors, are utilized as the source of heat. These have been called *solar engines*.

**CALORIMETER**, a measurer of the degree of heat (q.v.).

**CALORIMETER**, a powerful galvanic battery devised by Dr. Hare. He placed a sheet of non-conducting substance, as paste-board, between a sheet of copper and another of zinc, rolled the whole together, and plunged the bundle into a barrel of acidulated water. As there was but one pair of plates, the intensity of the electricity produced was feeble, but because of the great surface, the quantity was large; effects which depend upon quantity, as heat, were produced in an intense degree. The same result is now attained by coupling the elements of many small cells in such a way that all the positive plates shall be united in one, and the negative plates in another.

**CALOTROPIS**. See **MUDAR**.

**CALOTTISTES** (*Le Régiment de la Calotte*), a society of witty and satirical men, in the time of Louis XIV., who were headed by two officers in the king's body-guard, named Torsac and Aimon. Their name was taken from the word *calotte* (a "small cap," worn by monks over the tonsure), and their amusement consisted in sending to any public character who had exposed himself to ridicule, a "patent," authorizing him to wear the *calotte* as a covering for the weak part of his head. The armorial bearings of the *Régiment de la Calotte* consisted of various symbols of folly, with the motto, "*C'est régner que de savoir rire*." When Torsac, its first "generalissimo," died, the society, which occupied a position of satirical hostility to the French academy, drew up a burlesque funeral oration, manufactured out of the pompously eulogistic phrases that the academicians were in the habit of using. As the society became audacious, and did not spare even royalty itself, it was dissolved by the minister Fleury. The *Mémoires pour servir à l'Histoire de la Calotte* (Basel, 1735) is an amusing little book. During the restoration, the title *Régime de la Calotte* was applied to the priestly administration of affairs.

**CALOTYPE PROCESS** (Gr. *kalos*, beautiful, *typos*, impression), a title comprehending a variety of methods for the production of negative photographs on paper; and so named by the inventor, the late Dr. H. Fox Talbot, who exhibited the result of his experiments in the year 1840. The *principle* involved in the C. P. depends on the susceptibility to the action of daylight of a surface chemically prepared, and the *practices* consists in the preparation, and exposure in the camera, of a sheet of paper, having on one surface an even and finely divided layer of iodide of silver, nitrate of silver, and an organic acid; the image obtained on this surface being subsequently developed with gallo-nitrate of silver. It will be unnecessary here to describe the various modifications which have been introduced with the object of imparting a high degree of sensibility to the paper; one process—the best—will suffice to describe the manipulation.

Good plain paper, sized with gelatine, should be chosen, the foreign starch-sized papers being unsuitable, on account of the solutions sinking in too deeply, and thus impairing that sharpness of outline which should be possessed by a good negative. The paper is then floated on one side, and for a moment only, on a solution of iodide of silver in iodide of potassium; prepared by adding freshly precipitated iodide of silver to a *strong* solution of iodide of potassium. It is then dried, and plunged into a dish containing distilled water, which, by removing the soluble iodide of potassium, precipitates the iodide of silver in an even and finely divided condition over the whole surface of the paper, which in this state will keep good for twelve months. It is now ready to receive the *sensitive coating*; this operation, which is called *exciting* the paper, is performed in the following manner: Two solutions are prepared—one, a saturated solution of gallic acid in cold distilled water, called solution A; the other, a solution of 50 grains of nitrate of silver in 1 oz. of distilled water, to which 1 dram of glacial acetic acid has been added; this is called solution B. The iodized paper obtained as above is now laid on a board having a piece of clean blotting-paper on it a little larger than the paper to be excited, and the following solution brushed over it with a clean Buckle's brush: distilled water, 1 oz.; solution A, 15 drops; solution B, 15 drops. This mixture, prepared in a chemically clean glass vessel, should be freely applied, and the excess absorbed by clean blotting-paper. The paper is now ready for exposure in the camera, and may be at once placed in the dark slide; or a stock may be thus sensitized and preserved between folds of blotting-paper until required for use. The *time of exposure*—varying from three minutes to a quarter of an hour—is determined by the diameter and focal length of the lens employed, the aperture of the diaphragm or stop, and the amount of light prevailing at the time. The *development of the latent image*, an operation which, like the preceding, is, of course, conducted in a room illuminated only by yellow light, is accomplished by applying freely and uniformly over the whole surface solution A; and when the image begins to appear, applying a second quantity, to which a few drops of solution B have been previously added, to increase the intensity. The whole operation of development occupies about a quarter of an hour; and when the details are fully out, the picture should be washed with water, and *fixed*, by immersion in a solution of 1 part of hyposulphite of soda to 4 parts of water; it is then again freely washed in frequent changes of water during several hours; it is lastly *dried* and *waxed*; when it may be regarded as a finished negative, from which positive prints may be obtained, having the lights and shadows as in nature. See **POSITIVE PRINTING**.

**CALOVIVUS**, ABRAHAM, 1612-86; a Lutheran minister, rector at Dantzic, and professor at Königsberg and Wittenberg. He was a strong controversialist, a vigorous supporter of his sect, and author of *Systema locorum theologicorum* (1665-77).

**CALOYERS**, a general name for the monks of the Greek church. The name is a corruption of two Greek words, *kalos* and *geron*, and signifies "good old men." The C. follow the order of St. Basil, and are divided into three ranks: the novices, called *archari*; the ordinary professed, called *microchemi*; and the more perfect, called *megalochemi*. It is always from among them that bishops and patriarchs are chosen, because they are generally members of the most distinguished families of the upper and middle classes. The C. also furnish the only learned theologians in Greece at the present day. Their monasteries are very numerous. The most celebrated in Asia is that of Mt. Sinai, founded by the emperor Justinian, and endowed with a revenue of 60,000 crowns. In Europe, Mt. Athos alone has twenty, the inmates of which have so great a reputation for sanctity, that even the Turks seek an interest in their prayers. The C. are obliged to labor for the benefit of their monastery as long as they continue in it. Their religious services occupy an unnaturally large portion of their time, beginning at midnight and continuing at intervals until sunset. They observe four Lents: the first, of eight weeks, in commemoration of the resurrection of our Lord; the second, of three weeks, in honor of the holy apostles; the third, of fourteen days, in commemoration of the assumption of the Virgin; and the fourth, in commemoration of the advent.—There are also female C., or Greek nuns, who likewise follow the rule of St. Basil.

**CALPE**. See **HECULES**, **PILLARS OF**.

**CALPEE**, a city of Jhansi, one of the n.w. provinces of India, on the right bank of the Jumna, in lat. 26° 7' N., and long. 79° 48' east. Pop. '91, 12,700. It is an entrepôt for the cotton of the neighboring district. It has manufactures of cotton and paper, and is celebrated for the beauty of its refined sugar. It became British by capture and cession, respectively, in 1803 and 1806. It is 51 m. s.w. of Cawnpore, and is closely linked with it in the history of the insurrection of 1857-58, as the head-quarters of the Gwalior contingent.

**CALPENTYN**, a long and narrow peninsula on the w. side of Ceylon, in lat. 8° 14' N., and long. 79° 58' east. The neck is so low as to be overflowed during the n.e. monsoon, so that it is transformed into an island.

**CALPURNIUS**. The Calpurnia gens was, by its own account, one of the oldest plebeian clans in Rome; but it does not figure in history till the time of the first Punic war. The family names, in the time of the republic, were Bestia, Bibulus, Flamma, and Piso.—**MARCUS CALPURNIUS BIBULUS** is known as the hostile but incapable colleague of Cæsar (q.v.) in the consulate. He was put up by the aristocratic party, who spent vast sums to carry the election. He finally joined the Pompeian party, had command of the fleet intended to prevent Cæsar's passage to Greece, and died 48 B.C., before the battle of Dyrrhachium. Among the Roman women of this family, two are celebrated—**CALPURNIA**, the daughter of Calpurnius Piso (consul 58 B.C.), and the last wife of Cæsar, who seems, from the scanty notices of her we possess, to have been a quiet domestic woman, full of love and solicitude for her great husband; and **CALPURNIA**, the daughter of L. Calpurnius Bestia, wife of P. Antistius, who killed herself when her husband was murdered by order of the younger Marius, 83 B.C.

**CALPURNIUS**, **TITUS JULIUS**, surnamed **SICULUS**, a pastoral poet who lived in Sicily about the end of the 3d century. He seems to have been an imitator of Virgil, but beyond his complaining of poverty nothing is known of his personal history.

**CALTABELLO'TA** (a Saracenic name = "the castle of the cork-trees"), a t. of Sicily, Girgenti, 7 m. n.e. of Sciacca, most picturesquely situated around an ancient castle, which crowns a steep rock overhanging a stream (anc. *Orimisus*), of the same name as the town. Of its churches the *Chiesa Matrice* is a beautiful relic of the middle ages, resembling a mosque, with a single row of columns down the middle. C. was captured by the Saracens in 840 A.D. Pop. about 6,200.

**CALTANISSETTA**, a province in Sicily, s. of Palermo; 1,263 sq. m.; pop. '95, 325,591. The soil is fertile, producing grapes, olives, almonds, hemp, cotton, etc. Marble, agate, alabaster, sulphur, and iron ore are found. Agriculture is the chief industry, but there are foundries and manufactories of chemicals.

**CALTANISSETTA**, a fortified t. of Sicily, situated on a fertile plain near the Salso, about 28 m. n.e. of Girgenti. It has mineral springs and extensive sulphur-works. Pop. '94, 35,500.

**CALTAVUTURO**, a t. of Sicily, province of Palermo, and 37 m. s.e. of the city of that name, on a small river, the Grande. The town is of Saracenic origin. Jasper is found near C. Pop. about 5,600.

**CALTHA**. See **MARSH MARIGOLD**.

**CALTONICA**, a t. of Sicily, about 15 m. n.w. of Girgenti. It has pretty extensive sulphur-works and salt-works. Pop. 7,000.

**CALTROP**, **CALTHROP**, or **CALTHORP**, in military warfare, is a four-pronged piece of iron, each prong about four in. in length. When it is wished to check the approach of

the enemy's cavalry over a plain, or of his besiegers in the ditch of a fortification, caltrops are sometimes thrown down; from their shape, one prong is sure to stand upright, and may work terrible mischief. See *illus.*, *FORTIFICATION*, vol. VI.

**CALUIRE**, a t. of France, in the department of the Rhone, situated on the left bank of the Saone, about 3 m. n.e. of Lyon. It has three annual fairs. Pop. '91, 7600.

**CALUMBA**, or **COLOMBO**, very extensively used in medicine, is the root of *cocculus palmatus*, a herbaceous plant of the natural order *menispermaceæ* (q.v.). It is said to derive its name from Colombo in Ceylon, although the C. now chiefly in use is the produce of Mozambique. The flowers in this genus have 12 sepals and petals in all, similar in appearance, and disposed in four rows. The male and female flowers are on separate plants. *C. palmatus* has nearly circular leaves with 5 to 7 lobes, on long hairy foot-stalks, and solitary axillary racemes of small green flowers, the racemes of the male plants branching. The fruit is a drupe, or 1-seeded berry-like fruit, about the size of a hazel-nut, densely clothed with long hairs. The stem is annual and twining; the root perennial, consisting of clustered spindle-shaped fleshy tubers, with a brown warty epidermis, and internally deep yellow. The plant is not cultivated: the root is collected where it grows wild in dense forests. It is dug up in Mar., cut into slices or short cylindrical pieces, and dried in the shade. In this state it appears in commerce, having a greenish-yellow tint, a very bitter taste, and a faint aromatic odor. Its bitterness is ascribed to a somewhat narcotic principle called calumbine, and to *berberine*, an alkaloid originally discovered in the barberry (q.v.), which is also present in it. C. is regarded as one of the most useful stomachics and tonics. It is demulcent, not at all stimulant, and capable of being employed in cases in which almost every other tonic would be rejected by the stomach. It is sometimes given to allay vomiting. It has been found very useful in diarrhea and dysentery. It is administered in the form of powder, infusion, or tincture. Similar properties seem to reside in the roots of the species of *cocculus* generally.—The very poisonous seed known by the name of *cocculus Indicus* (q.v.), belongs to a plant of a different but allied genus.—The root of *fraxera walteri* is sometimes fraudulently substituted for C., and has been called American calumba root. It does not agree with C. in its properties, but, besides its very different appearance, it may be distinguished by its undergoing no such change of color when touched with tincture of iodine, as in true C. root is produced by the presence of starch. See **FRASERA**.

**CALUMET**, the "peace-pipe" of the North American Indians, is a tobacco-pipe having a stem of reed about two feet and a half long, decorated with locks of women's hair and feathers, and a large bowl of polished marble. It plays an important part in the conclusion of treaties, of which, indeed, it may be described as the ratifier. After a treaty has been signed, the Indians fill the C. with the best tobacco, and present it to the representatives of the party with whom they have been entering into alliance, themselves smoking out of it afterwards. The presentation of it to strangers is a mark of hospitality, and to refuse it would be considered an act of hostility.

**CALUMET**, a co. in e. Wisconsin, on Winnebago lake; 340 sq.m.; pop. '90, 16,639. It is a hilly region, but with abundance of timber and good pasturage, and produces grain, hay, hops, wool, etc. Co. seat, Chilton.

**CALUMET**, a town and village in Houghton co., Mich., on the Hancock and Calumet railroad, and in the heart of the copper district of the state. It is situated 42 miles north of L'Anse by rail, and has excellent connections with the rest of the peninsula. Here is situated the famous Calumet and Hecla copper-mine, which is said to be the richest in the world. (See **COPPER**; **MICHIGAN**.) The town has manufactories, banking facilities, newspapers, and churches. Pop. 1890, town, 12,529; village, 1159.

**CALUMNY**. An ancient regulation of the Scotch law obliged litigants to give their *oath of C.*—that is, they swore, either by themselves or by their counsel, that the facts alleged by them were true, although in practice this oath was not usually put unless one of the parties required it of his adversary. In the modern practice, however, of the court of session, this oath is confined to actions for divorce, and other consistorial cases.

**CALUMNY**, LAW AS TO. See **LIBEL**.

**CALUSO**, a t. of n. Italy, in Piedmont, province of Turin, about 11 m. s. of Ivrea, and connected with Turin by railway. Pop. 6000.

**CALVADOS**, a maritime department in the n.w. of France, bounded n. by the English channel, and e., w., and s. by the departments of Eure, Manche, and Orne. It is formed out of a part of the old province of Normandy. The principal rivers are the Touques, Orne, Dives, Seulle, Dromme, and Vire. The coast, which has few bays or inlets, is partly formed by bold ridges, and partly by sand-downs, cliffs, and reefs. The reef extending between the mouths of the Orne and the Vire, called Calvados, after one of the vessels in the Spanish armada shipwrecked here, and from which the department takes its name, is very dangerous to navigation. The soil of the department is generally fertile, especially in the valleys, supplying rich pasturage for horned cattle, sheep, horses, and swine, which constitute the principal wealth of Calvados. The climate is healthy, though changeable. Iron, marble, slate, and coal are found. There are various manufactures, and the coast-fisheries are of some importance. C. has an area of 2192

sq.m., with a pop. in 1896 of 417,176, and is divided into six arrondissements. Caen is the capital.

**CALVAERT**, DIONYS, called also DIONISIO FLAMMINGO, a distinguished painter, especially in landscape, was b. at Antwerp in 1555. He settled early at Bologna, where he opened a school, and had among his students the celebrated Domenichino, Guido, and Albani, who were, afterwards, however, pupils of the Caracci. Many excellent pictures by him are still preserved at Bologna. He died in 1619.

**CALVARY**, MOUNT, the scene of our Saviour's crucifixion, is an eminence which lay at the n.w., and just on the outside, of the ancient city of Jerusalem. Calvary, or Calvaria, is a translation into Latin of the Hebrew word Golgotha, signifying a "skull," either because the mount was a place of public execution, or because it was shaped like a human skull.

**CALVARY**, in Roman Catholic countries, is a representation of the various scenes of the passion and crucifixion of our Lord, either in a chapel, or external to the church, as at St. Jacques at Antwerp. It consists of three crosses with the figures of Christ and the thieves, usually as large as life, surrounded by a number of figures, representing the various personages who took part in the crucifixion. At Aix-la-Chapelle, the C. is a church on the top of a hill, surrounded by twelve sculptured stones, each marking an event which took place on the journey of the Saviour to Mount Calvary. The approach to the C. is called the *Via Dolorosa*, each of the stones marking what is called a station, at which the pious say a prayer in passing.

**CALVELLO**, a t. in the province of Basilicata, Italy, pleasantly situated on a hill-slope about 13 m. s. of Potenza. It has two convents. Pop. about 5000.

**CALVENTURA ISLANDS**, off the coast of Arracan, in the bay of Bengal, their center being in lat. 16° 53' n., and long. 94° 20' east. The group consists of two divisions—one to the s.e., which is composed of two lofty and well-wooded islets; and another to the n.w., which presents seven bare rocks, chiefly of fantastic shapes.

**CALVERT**, a co. in Maryland, on Chesapeake bay; 218 sq.m.; pop. '90, 9660, includ. colored. Its surface is rolling, with good soil, having marl in abundance. The chief productions are tobacco, corn, and oats. Co. seat, Prince Fredericktown.

**CALVERT**, GEORGE and CECIL. See BALTIMORE, LORD.

**CALVERT**, GEORGE HENRY, b. Baltimore, 1808; a graduate of Harvard, and for a long time editor of the *Baltimore American*. In 1832, he published *Illustrations of Phrenology*, the first treatise on the subject issued in this country. Among his works are a *Metrical Version of Schiller's Don Carlos*; *Scenes and Thoughts in Europe*; *Cabiro*, a Don Juanic poem; *An Introduction to the Social Sciences*; *The Gentleman*; *Aynta and Other Poems*; *First Year in Europe*; *Ellen, a Poem*; and *Goethe, his Life and Works*. In 1848, he removed to Newport, R. I., of which city he was chosen mayor in 1853. He d. 1889.

**CALVERT**, LEONARD, abt. 1606-47; brother of the second lord Baltimore, and first governor of Maryland. In 1633, he led the first expedition to Maryland in two small vessels, and on the 25th of Mar., 1634, at St. Clement's island on the Potomac, a regular mass was celebrated. Immediately afterwards they settled on the right bank of a river called by them St. George, and founded the prospective city of St. Mary, few signs of which now remain. After much difficulty with the people of Virginia the colonists under Calvert were fully established, and in 1647 his name as governor of the province was recognized.

**CALVI**, a seaport on the island of Corsica, situated on a peninsula in the gulf of Calvi, about 38 m. w.s.w. of Bastia, lat. 42° 35' n., long. 8° 43' east. It is strongly fortified, and has a good port, with a high light at its entrance, and a considerable export trade. C. was captured by the English in 1794, after a siege of 51 days. Pop. about 3000.

**CALVILLE**, a kind of apple, of which there are numerous sub-varieties. The calvilles diminish in thickness from the middle towards the calyx, where they form a point; they have regular ribs and a large open seed-chamber; also a pleasant smell, and are unctuous to the touch. They are never altogether streaked; they have a fine loose flesh, with a flavor somewhat resembling that of the raspberry or strawberry. The white winter C. is in high repute both as a culinary and dessert apple; it is very extensively cultivated on the continent of Europe.

**CALVIN**, JOHN, one of the most eminent of the reformers of the 16th c., was b. at Noyon, in Picardy, on the 10th of July, 1509. His father, Gerard Cauvin or Calvin, was procureur-fiscal of the district of Noyon, and secretary of the diocese. He was one of six children—four sons and two daughters. All the three sons who survived were bred ecclesiastics; and the reformer himself, while still only 12 years of age, was appointed to a chaplaincy in the cathedral church of Noyon. This he held as a means of support during the period of his education, and even for some short time after he had entered on his reforming career. C. was educated in circumstances of ease, and even affluence. The noble family of Mommor, in the neighborhood, invited him to share in the studies of their children; he was in some measure adopted by them, and when the family went to Paris, in his 14th year, he accompanied them, and participated in the benefits of the higher instruction which was there attainable. He was entered as a pupil in the Collège

de la Marche, under the regency of Mathurin Cordier, better remembered, perhaps, by his Latin name of Corderius. It was under this distinguished master that C. laid the foundation of his own wonderful mastery of the Latin language. During this early period, he was distinguished by the great activity of his mental powers, and the grave severity of his manners. His companions, it is said, surnamed him the "Accusative."

For awhile, his attention was directed to the study of law. His remarkable talents seemed to promise great success in this branch of study, and his father sent him, with the view of prosecuting it, to the university of Orleans, then adorned by Pierre de l'Etoile, one of the most famous jurists of his day, and afterwards president of the parliament of Paris. At Orleans, he continued the same life of rigorous temperance and earnest studiousness for which he was already noted. Beza says that, after supping moderately, he would spend half the night in study, and devote the morning to meditation on what he had acquired. His undue habits of study seem to have laid thus early the foundation of the ill-health which marked his later years. It was while a law-student in Orleans that he became acquainted with the Scriptures, and received his first impulse to the theological studies which have made his name so distinguished. A relative of his own, Pierre Robert Olivetan, was there engaged in a translation of the Scriptures; and this had the effect of drawing C.'s attention, and awakening within him the religious instinct which was soon to prove the master-principle of his life. We cannot say as yet that his traditional opinions were unfixed, or that he had embraced with any decision the Protestant opinions that were spreading everywhere; but the seeds of the new faith were now beyond doubt sown in his heart, and from this time, although he still continued for awhile longer to pursue his legal studies, his main interests appear to have been religious and theological. From Orleans he went to Bourges, where he acquired the knowledge of Greek, under the tuition of a learned German, Melchior Wolmar, to the influence of whose spiritual instructions he was also greatly indebted. He began here to preach the reformed doctrines, and passed over into the ranks of Protestantism, under the slow but sure growth of his new convictions, rather than under the agitation of any violent feeling. Here, as everywhere, his life presents a marked contrast to that of Luther.

He proceeded to Paris in 1533, which at this date had become a center of the "new learning," under the teaching of Lefevre and Farel, and the influence of the queen of Navarre, sister of Francis I. The Sorbonne itself had not escaped the infection. There was a growing religious excitement in the university, in the court, and even among the bishops. This, however, was not to last. The king was soon stirred up to take active measures to quell this rising spirit; and the result was that C. and others were obliged to flee for their lives. The story is that C. narrowly escaped, having descended from his window by means of his sheets, and fled, under the guise of a vine-dresser, a friend of his, in whose clothes he concealed himself. After this he repaired for a short time to his native place, resigned the preferment he held in the Roman Catholic church, and for a year or two led a wandering life, sheltered in various places. We find him at Saintonge; at Nerac, the residence of the queen of Navarre; at Angoulême, with his friend Louis Tillet; then for a brief while at Paris again, strangely enough expecting a meeting with Servetus, who had expressed a desire to see and confer with him. Persecution against the Protestants at this time raged so hotly, that C. was no longer safe in France; and he betook himself to Basel, where he is supposed to have prepared the first edition of the *Institutes of the Christian Religion*, and whence he certainly issued, in the year 1535, the famous preface addressed to Francis I. The concentrated vigor of this address, its intensity of feeling, rising into indignant remonstrance, and at times a pathetic and powerful eloquence, make it one of the most memorable documents in connection with the reformation. It is throughout a noble defense of the righteous character of the reformed doctrines, and their support alike in Scripture and in history. The energetic decisiveness and moral zeal of the future teacher and legislator of Geneva, speak in every page of it. After completing this great service to the cause of Protestantism, he made a short visit to Italy, to Renée, the duchess of Ferrara. Finally, he revisited his native town; sold the paternal estate, which had devolved to him on the death of his eldest brother; and bidding it adieu, set out in company with his younger brother and sister on his way to Strasburg. The direct road being rendered dangerous by the armies of Charles V., which had penetrated into France, he sought a circuitous route through Savoy and Geneva.

The result of this journey was memorable for the cause of the reformation. Arrived in Geneva, he met there his friend, Louis Tillet, who communicated the fact of his arrival to Farel, then in the very midst of his struggle to promote the reformation in the city and neighborhood. Farel hastened to see him, and urge upon him the duty of remaining where he was, and undertaking his share of the work of God, under the burden of which he was like to fail. C. did not at first respond to the call. He was given, he himself says, to his "own intense thoughts and private studies." He wished to devote himself to the service of the reformed churches generally, rather than to the care of any particular church. A life of intellectual and theological labor was that which at that time was most congenial to him. By some strange insight, however, Farel penetrated to the higher fitness of the young stranger who stood before him, and he ventured, in the spirit of that daring enthusiasm which characterized him, to lay the curse of God



upon him and his studies if he refused his aid to the church of Geneva in her time of need. This seemed to C. a divine menace. "It was," he said, "as if God had seized me by his awful hand from heaven." He abandoned his intention of pursuing his journey, and joined eagerly with Farel in the work of reformation.

Such was the beginning of C.'s great career in Geneva. Having entered upon his task, he soon infused an energy into it which crowned the struggling efforts of Farel with success. The hierarchical authority was already overturned before his arrival; the citizens had asserted their independence against the duke of Savoy, whose alliance with the corrupt episcopate, which was the direct governing influence in the place had called forth the patriotic as well as the religious feelings of the people. The magistrates and people eagerly joined with the reformers in the first heat of their freedom and zeal. A Protestant confession of faith was drawn out, approved of by the council of two hundred, the largest governing board of the city, and then proclaimed in the cathedral church of St. Peter's as binding upon the whole body of the citizens. Great and marvelous changes were wrought in a short time upon the manners of the people; where license and frivolity had reigned, a strict moral severity began to characterize the whole aspect of society. The strain, however, was too sudden and too extreme. A spirit of rebellion to the rule of C. and Farel broke forth; they refused to yield to the wishes of a party animated by a more easy and liberal spirit than themselves, and known in the history of Geneva under the nickname of Libertines; and the consequence was, that they were both expelled from the city after less than two years' residence.

C. retreated to Strasburg, where he had meant to go when arrested in his course at Geneva. Here he settled, and devoted himself to theological study, and especially to his critical labors on the New Testament. Here, also, in Oct., 1539, he married the widow of a converted Anabaptist. The marriage appears to have proved a happy one, although not of long duration.

The Genevans found, after a short time, that they could not well get on without Calvin. His rule might be rigid; but an authority, even such as his, which might gall from its severity, was better than no settled authority at all; and the libertine party seem to have been unable to construct any efficient and beneficent form of government. Accordingly, they invited C. to return; and after some delay on his part, in order to test the spirit in which they were acting, he acceded to their invitation, and in the autumn of 1541, after three years' absence, once more made his entry into Geneva.

Now, at length, he succeeded in establishing his plan of church-government, in all its forms and details. By his college of pastors and doctors, and his consistorial court of discipline, he founded a theocracy, with himself at the head of it, which aimed virtually to direct all the affairs of the city, and to control and modify both the social and individual life of the citizens. Not without a struggle, it may be supposed, did he succeed in his great autocratic scheme. The libertines, although dishonored by their ineffectual attempts to maintain order in the city, and uphold its rights and dignity, still remained a strong party, which was even augmented, after C.'s return, by men such as Amy Perrin, who had strongly concurred in the invitation to C., but who were afterwards alienated from him by the high and arbitrary hand with which he pursued his designs, as well as by their own schemes of ambition. The struggle with this party lasted with various fortune for no less a period than 15 years, and was only terminated in 1555, after a somewhat ridiculous *émeute* in the streets. Amy Perrin and others, driven from the city, were executed in effigy; and the reformer's authority from this date confirmed into an absolute supremacy.

During the period of this long struggle with the libertines, C. had many other disputes, in which he conducted himself with no less heartiness and zeal. The most remarkable of these were his controversies with Sebastian Castellio, Jerome Bolsec, and above all, Michael Servetus.

C. had become acquainted with Castellio at Strasburg. They entertained at first a warm friendship for each other, and C. showed great zeal in assisting Castellio, whose poverty and learning had attracted his sympathy. When he returned to Geneva, he invited Castellio to join him there, and procured for him the title of regent or tutor in the gymnasium of the city. There was little similarity, however, in the characters of the two men, and the diversity of their tastes and views soon became apparent. The learning of Castellio was intensely humanistic; a classical spirit and a somewhat arbitrary opinionativeness molded all his studies; and as soon as he began to apply himself to theology, he came into conflict with Calvin. In a letter to Farel in 1542, we find C. speaking of the freaks of "our friend Sebastian, which may both raise your bile and your laughter at the same time." These freaks relate to Castellio's notions of scriptural translation, and his refusal of C.'s offer to revise the version which he had made of certain parts of Scripture. Then, two years later, when Castellio desired to enter into the ministry, C. dissuaded the council from accepting him, on account of some peculiar opinions which he held. These were certain rationalistic views as to the authenticity and character of the Song of Solomon, the descent of Christ into hell, and also about election. After this, Castellio left Geneva for awhile, but soon returning, he attacked the views of C. openly. After a violent scene in church, which is painted in C.'s letters very strongly, he was forced to leave the city. The two old friends, now declared enemies, did not spare each other henceforth. The fate of Servetus drew forth an anonymous publication, attacking

with keen logic and covert and ingenious sarcasm the Genevan doctrines. This publication was attributed by both C. and Beza to Castellio, and they replied to him in no measured terms, stigmatizing him as a "deceiver and vessel of Satan." One fact really disgraceful to C. in the controversy deserves not to be passed over. Sunk in great poverty, Castellio was obliged, in his old age, to gather sticks on the banks of the Rhine at Basel, as a means of support. C. did not hesitate to accuse him of stealing the sticks. Such polemical truculence may well make us turn away in disgust and indignation.

The controversy with Bolsec belongs to a later period. Jerome Bolsec was originally a Carmelite monk, but he had thrown aside the habit, and betaken himself to the practice of medicine in Geneva. He was led to attack C.'s doctrine of predestination. As soon as C. heard of this, he led him to understand that he was not at liberty to question the Genevan doctrine. He and the other clergy dealt with him; but after repeated disputations Bolsec was found incorrigible, and was sentenced to banishment from the city. Cast out of the theocratic community, he ultimately re-joined the Roman Catholic church, and revenged himself in a somewhat mean way against C. by writing his life in a spirit of detraction and slander.

Of all these contests, however, the most memorable is that with Servetus. A melancholy interest encircles the name of this great heretic, which the criminal tragedy of his death keeps always fresh and vivid in the minds of all who hate intolerance, and who love truth rather than dogmatism. The character of Servetus himself has little to do with this interest. He seems to have been more of a vain, restless, and enthusiastic dreamer, than of a calm and patient inquirer. In his very dreams, however, and the vague audacities of his speculation, there is a kind of simplicity and unconscious earnestness that wins sympathy. He had entered into various connections with C., even from the time of his early residence in Paris; particularly, he had sent him various documents containing the views, fully developed in his work subsequently published under the title of *Restitutio Christianismi*. C. never concealed his abhorrence of these views; and in a letter to Farel as early as 1546, he threatens that if Servetus should come to Geneva, he would do what he could to bring him to condign punishment: *Nam si venerit, modo valeat mea auctoritas, vivum exire nunquam patiar*. The history of his seizure and condemnation at Vienne by the Catholic authorities, and especially of C.'s share in the correspondence which led to his seizure, is very complicated and obscure. It has been maintained that C. was the instigator, through a creature of his own of the name of Trie, of the whole transaction; it is certain that he forwarded to the authorities, through Trie, private documents which Servetus had intrusted to him, with a view to the heretic's identification, and as materials for his condemnation. Servetus was sentenced to be burned, but effected his escape, and, after several months' wandering, he was found at Geneva. It was his intention to proceed to Italy, where he hoped his opinions might meet with some degree of toleration, and he arrived at Geneva on his way. This is the explanation of an event otherwise unaccountable. Having ventured to church, according to the common account, he was recognized, apprehended, and conveyed to prison by C.'s order, just as he was about to leave the city. The particulars of his trial are full of interest, but too lengthened to be detailed here. It lasted, with various interruptions, for two months. He attacked C. with the most foul epithets, and C. retorted with a virulence and foulness quite equal to his own. At length, on the 26th of Oct., 1553, sentence was passed upon Servetus, condemning him to death by fire. C. used his influence to have the mode of death alleviated, but without success. On the very next morning, the sentence was put into execution. On an extended eminence at some distance from the city, Servetus was fastened to a stake surrounded by heaps of oak-wood and leaves, with his condemned book and the MS. he had sent to C. attached to his girdle; and, amid his agonizing cries, the fire was kindled, and the wretched man expiated his heresy amidst the flames. Whatever apologies may be urged for this memorable crime, it must remain a mournful and scandalous blot on the history of the reformation. The disgrace of it has particularly attached to C., and with some justice, from the special and unhappy relation which he bore to the whole transaction; but most of the reformers are no less implicated in it. The wise Bullinger defended it, and even the gentle Melancthon could only see cause for gratitude in the hideous tragedy.

After the execution of Servetus, and the expulsion of the Libertines, two years later, C.'s power in Geneva was firmly established, and he used it vigorously and beneficently for the defense of Protestantism throughout Europe. By the mediation of Beza, he made his influence felt in France in the great struggle that was there going on between the hierarchical party, with the Guises at its head, and the Protestants, led by Condé and Coligny. In 1561, his energies began to fail. He had been long suffering from bad health, but his strength of will and buoyancy of intellect sustained him amid all his bodily weakness. In the year now mentioned, his bad health greatly increased, and although he survived for more than two years, he never regained any vigor. He died on the 27th of May, 1564.

Very different estimates, it may be imagined, have been formed of C.'s character, according to the point of view from which it is contemplated. None, however, can dispute his intellectual greatness, or the powerful services which he rendered to the cause of Protestantism. Stern in spirit, and unyielding in will, he is never selfish or

petty in his motives. Nowhere amiable, he is everywhere strong. Arbitrary and cruel when it suits him, he is yet heroic in his aims, and beneficent in the scope of his ambition. Earnest from the first, looking upon life as a serious reality, his moral purpose is always clear and definite—to live a life of duty, to shape circumstances to such divine ends as he apprehended, and, in whatever sphere he might be placed, to work out the glory of God.

He rendered a double service to Protestantism, which, apart from anything else, would have made his name illustrious: he *systematized its doctrine*, and he *organized its ecclesiastical discipline*. He was at once the great theologian of the reformation, and the founder of a new church polity, which did more than all other influences together to consolidate the scattered forces of the reformation, and give them an enduring strength. As a religious teacher, as a social legislator, and as a writer, especially of the French language, then in process of formation, his fame is second to none in his age, and must always conspicuously adorn the history of civilization. Among C.'s most important works are: *Christianæ Religionis Institutio* (Basel, 1536); *De Necessitate Reformandæ Ecclesiæ* (1544); *Commentaires sur la Concordance ou Harmonie des Évangélistes* (Gen. 1561); *In Novum Testamentum Commentarii*; *In Libros Psalmorum Commentarii*; *In Librum Geneseos Commentarii*. The first edition of C.'s whole works is that of Amsterdam, 1671, in 9 vols. fol. A complete critical edition by Baum, Cunitz, and Reuss began to appear at Brunswick in 1869. By the "Calvin translation society," in Edinburgh, his works have been collected, translated into English, and issued in 51 vols. 8vo, 1843-55. Besides the original *Vita* by Beza, there are lives of C. by Bolsec (from the Catholic standpoint, 1577; new ed. 1875), Audin (1840), Bungener, Viguet and Tissot (1864); and in Germany, by Henry (1844), Stähelin (1863), and Pierson (1863).

**CALVINISM** is the system of religious doctrine associated with the name of Calvin, and supposed to distinguish the churches more particularly called the reformed, in contradistinction to the Lutheran and Anglican churches. Calvin's doctrinal views are laid down at length in his *Institutio Christianæ Religionis*, first published in 1536. It was not till many years later, however, that the name of C. came to be attached to a certain set of doctrinal opinions, and not till the rise of Arminius (q.v.) and the synod of Dort (q.v.) in 1618, that these opinions may be said to have been polemically marked off from others with which they are generally contrasted, and to which they are recognized as standing in opposition.

The difference of thought expressed in the Arminian and Calvinistic system is as old as the history of Christian doctrine. In almost every point, Augustine may be said to have anticipated Calvin; while Pelagius and the eastern divines, such as Chrysostom, represented a type of opinion upon the whole consonant to that which in more modern times has been opposed to Calvinism. In the Roman Catholic church, since the reformation, the same opposition of thought has presented itself in the famous contest of Jansenism and Jesuitism.

The main point of distinction in the two systems or modes of Christian opinion, is as to the operation of divine grace in the salvation of sinners. In the one system, this operation is considered as predetermined and absolute; in the other, as merely prescient, and in some sense conditioned. *Predestination* and *irresistible grace* are the great key-notes of C.—its two main points. Others were added in opposition to Arminianism—viz., *original sin*, *particular redemption*, and the *perseverance of the saints*; but the first of these is not peculiarly Calvinistic, and the last two are merely corollaries from the doctrines of predestination and grace. Predestination is, in fact, the one distinguishing doctrine of the system, as it was of Augustinianism, of which C. was merely the revival. The divine will, apprehended as decreative and predestinating, is necessarily *irresistible* in its efficacy, *select* in its objects, and *persevering* in its results. The characteristic of C., therefore, is that it is a speculative Christian system, springing from a single great principle, carried out rigorously into all its logical consequences.

The church of England, in its earlier history, was Calvinistic in its creed, although mediæval and Catholic in its ritual. Puritanism was nothing else than a movement to reduce it altogether to a Calvinistic model. In the reaction which followed this movement, the church of England, while retaining its original articles, nearly parted with its Calvinistic faith; and throughout the 18th c., its chief divines are conspicuously Arminian or latitudinarian. But with the revival of the evangelical party in the end of the century, C. revived; and it still maintains, if not an absolute sway, yet a powerful influence over many minds in the Anglican establishment, while it is the professed creed of a great proportion of the dissenters.

The Church of Scotland, along with the other Presbyterian churches in Gt. Britain, and the large and numerous increasing bodies of Presbyterians in America, all hold to the Westminster confession of faith, the most elaborate and formal expression of Calvinistic doctrine that exists. But while holding to the same Calvinistic standard, these churches show many varieties of actual opinion; and in the history of Presbyterianism, C. has shown a tendency in its logical development to pass into rationalism or Unitarianism. This is conspicuously the case in the church of Geneva itself, and some of the old Puritan churches of America. It still remains, however, as opposed to Arminian, Socinian, or any cognate forms of the same type of doctrine, the most living and powerful among the creeds of the reformation.

**CALVINISTIC METHODISTS**, in Great Britain, are in three divisions: the Whitfield Connection, 1741; Lady Huntingdon Connection, 1748; and Welsh Methodists, 1750.

**CALVINIUS, SEPTIUS**, 1556-1615 or 17; astronomer and chronologist of Germany, who organized a system of chronology embodying the history of the world. The work was commended by Scaliger and Casaubon, but was condemned in the *Index Reputatorius*. In 1613, he published a work on the Gregorian calendar, undertaking to show the inadequacy of that system and to supplant it with one founded upon astronomical principles.

**CALW**, or **KALW**, an important manufacturing t. in Württemberg, chief seat of the Württemberg timber-trade with Holland, and capital of a bailiwick of the same name, in the circle of the Black forest, lies in the valley of the Nagold, on both sides of the stream, over which are two stone bridges. Cotton and woolen spinning, dyeing turkey-red, manufacturing woolen and cotton fabrics, making leather, stout shoes, cigars, etc., are the principal industries. Though the streets in the old town are irregularly built, there are many large and beautiful houses. Pop. 5000.

**CALX** is the Latin term for quicklime. As quicklime is produced by burning limestone, the alchemists applied the term C. to the product obtained by burning any ore or other mineral substance; and *calcination* (q.v.) to the process.

**CALYCANTHUS** (Gr. calyx-flower), a genus of plants of the natural order *calycanthaceae*, an order allied to *rosaceae*, and of which only a few species are known, natives of North America and Japan—shrubs, with square stems, which are of remarkable structure, having around the central woody axis four smaller imperfect ones. An aromatic fragrance characterizes this order. In the genus C., the bark and leaves possess it as well as the flowers. The bark of *C. floridus*, a native of Carolina, has been used as a spice and carminative, and has acquired the name of Carolina allspice, or American allspice. The flowers are of a chocolate color.

**CALYDON**, an ancient city of Ætolia,  $7\frac{1}{2}$  m. from the sea on the river Evenus, said to have been founded by Calydon, son of Ætolus, to have been the scene of the hunting of the Calydonian boar by Meleager and other heroes, and to have sent soldiers to the Trojan war. In 391 B.C., it was in possession of the Achæans, and so late as the time of Pompey, it was a place of importance. In 31 B.C., Augustus removed the inhabitants to Nicopolis, a city then founded to commemorate the victory of Actium.

**CALYDONIAN BOAR**. Once upon a time, according to a Greek myth, a certain Ceneus, king of Calydon, the ancient capital of Ætolia, omitted a sacrifice to Diana, whereupon the goddess, in her rage, sent into his fields a frightful boar, which committed great devastation. No one had the courage to hunt it except Meleager, the son of Ceneus, who, calling to his help the bravest heroes of Greece—Theseus, Jason, Nestor, and others—pursued and slew the monster. Later writers, however, affirm that he found it impossible to destroy the animal, until Atalanta, his mistress, aided him by piercing it with an arrow.

**CALYMENE**, a genus of the fossil order trilobites (q.v.). It differed from the other genera of the order in the individuals having the power of rolling themselves into a ball, so that they are often found coiled up like an oniscus, i.e., hog-louse—*vulgo*, a slater. The genus is characteristic of the Silurian formation. The species we figure has been long known as the "Dudley locust." It is remarkable as a very long-subsisting species, passing from the Caradoc beds to the Ludlow rocks. Twenty species have been described. See illus., SILURIAN AND DEVONIAN FOSSILS, vol. XIII.

**CALYPSO**, in Grecian legend, was, according to Homer, the daughter of Atlas, and inhabited the solitary wooded isle of Ogygia, far apart from all gods and men. Ulysses being thrown upon her island by shipwreck, she treated him kindly, and promised him immortality if he would marry her. He was fascinated by her charms, but unwilling to desert his wife and his native land; she detained him, however, seven years, and bore him two sons. On his departure, she died of grief.

**CALYPSO BOREALIS**, an orchid with heart-shaped leaf, and beautiful yellow, pink, and purple flower; growing in the bogs and moist woodlands of Northern New England, Oregon, Canada, and northern Europe and Asia.

**CALYPTRE** (Gr. *kalyptra*, a head-dress), a genus of gasteropodous mollusks, of the order *pectinibranchiata*, the type of a family, *calyptreidae*, formerly included in the genus *patella*, or limpet, when the mere form of the shell was more regarded in classification than the structure of the animal, and still known as chambered limpets, cup-and-saucer limpets, bonnet limpets, and slipper limpets. The shell is limpet-shaped, but the apex is more or less spiral, and has a calcareous process from its inner surface for the attachment of a principal muscle. The *calyptreidae* differ much in shape, some being very flat, and others very conical; some elongated and slipper-like. The species are generally natives of the shores of warm climates. Only two are British.—*Calyptreidae* are common in the older fossiliferous rocks.

**CALYX** (a term originally Greek), in botany, the outermost of the circles of modified leaves which surround the parts of fructification, and along with them constitute the flower. Within the C. there is generally at least a second circle of leaves, called the corolla (see COROLLA and FLOWER); but this is sometimes wanting, and the C. is

the only envelope of the parts of fructification. The leaves of which the C. is composed are called *sepals*, when quite separate from each other; but they often grow together into a tube at the base, and the C. is then said to be *monosepalous* or *gamosepalous* (*monos*, one; *gamos*, union). The sepals are generally simple and without stalks; they are generally green, and differ much less widely from ordinary leaves than the petals or leaves of the corolla; sometimes, however, they are *petaloid*, and brightly colored, as in *fuchsia*. The C. and corolla of many endogenous plants resemble one another almost completely, and the common term *perianth* (q.v.) is then very generally employed. In some plants, the C. passes insensibly into the corolla, and it is not easy to distinguish the innermost sepals from the outermost petals. The C. is in such cases often composed of more circles of leaves than one. The C. occasionally falls off when flowering is over (*deciduous*), as in *ranunculus*; sometimes even when it commences (*caducous*), as in the poppy; generally it remains till the fruit is ripe (*persistent*), and is then much enlarged and more brightly colored, as in *physalis*. It often becomes fleshy, and forms the seeming fruit, as in the rose.—The glumes (q.v.) of grasses, etc., used to be regarded as a C., to which, however, they have no proper analogy.

**CAM**, or **GRANTA**, a river of England, which, rising in Essex, flows n.e. through Cambridgeshire, and after a course of about 40 m., joins the Ouse  $8\frac{1}{2}$  m. above Ely. It gives its name to the town of Cambridge, which stands upon it, and below which it is navigable, and is classic on account of the boat-races on it by Cambridge students.

**CAM**, in machinery, a curved plate or groove, by which motion is communicated and controlled. The moving plate or groove is a *driver*; the rod, bar, or other thing moved, is called the *follower*. The follower is held against the driver by its weight or by a spring, or other device. The radii of the driver determine by their length the motion of the follower, and the angles which they make with some one, chosen as a base of calculation, fix the time at which change of motion occurs. For example, it may be desired that the follower shall move upward, and then downward, with a uniform velocity. From the center of the driver any convenient number of radii may be drawn, dividing equally the  $360^\circ$  of angular space. On one of these radii we mark the distance from the center of the driver at which the point of the follower will stand when in its position nearest to that center. Upon the opposite radius, distant  $180^\circ$  from the first, the point is marked which gives the furthest position of the follower; the difference between these radii being divided into as many equal parts as we have made angular spaces in the  $180^\circ$ , we increase the length of each radius in succession, beginning with the shortest, by one of those parts, and we draw a curve connecting the ends of the radii so terminated. Of course the greater the number of parts chosen for the division of the angular space and of the difference of the first and last radii, the more accurately will the curve be drawn. The edge of the driving-plate being cut to this curve, the follower being made to press constantly against it, and the driver being turned with a uniform rotation, the follower will move through its limited space with an equable motion, because the radii of the driver increase by constant amounts, at constant intervals of time. If the curve is reversed, the second part being the symmetrical opposite of the first part, the follower will descend as uniformly as it rose. The cam thus drawn is one of frequent use, and is called the *heart-shaped cam*. To avoid friction the end of the follower often carries a roller which works against the surface of the cam; in this case the cam-surface is found by drawing a line parallel to that above described, at a constant distance equal to the radius of the roller. If we wish the follower to rest at any part of a cycle of motion, the radii for that time will be made equal, and the corresponding cam-surface will be a circular arc; the time will be such a part of that of a complete cycle, as the angle between the radii of the ends of this arc, is of  $360^\circ$ . The cam-plate has sometimes a groove cut upon its flat side, and the end of the follower runs in the groove. A spiral groove may be cut into the surface of a cylinder as in a screw; if a follower be inserted in this groove it will be driven forward as the cylinder turns; when the groove reaches the end of the cylinder, it may turn back, and cause the follower to return with the same motion, or if the pitch of the groove be made shorter or longer, the return of the follower will be changed accordingly. By a judicious construction and arrangement of cams, almost every variety of motion may be produced with the greatest precision as to time and amount. A cam-form which does not make a complete revolution, but after moving a short distance in one direction oscillates in the opposite direction, is called a *wiper*. A familiar example may be seen in the engine-room of a steamboat, in the rocking arms which raise and let fall the valve rods.

**CAM**, Diogo, a Portuguese navigator of the 15th c., who continued the w. African discoveries commenced by Dom Henry. He had sufficient influence with the king of Congo to induce that monarch to permit the establishment of Christianity in his dominion.

**CAMALDOLITES**, a religious order founded in the vale of Camaldoli, near Arezzo, in the Apennines, in 1018, by St. Romauld, a Benedictine monk, and a member of the noble family of the dukes of Ravenna. From Italy it spread into France, Germany, and Poland. The brethren, who wear a white garment, are, and have always been, characterized for the excessive rigidity of their monastic rule; but except to show to

what lengths in a cruel mortification of natural life man can proceed, they have been practically useless in the world. The order is now almost extinct.

**CAMARGUE.** See BOUCHES DU RHONE.

**CAMARILLA**, a Spanish word, diminutive of *camara*, literally signifies a little chamber. As *camara* is used to designate, *par excellence*, the chamber of the king of Spain, the royal chamber, so C. is also used to designate his private chamber or cabinet, the place where he receives his most intimate friends, courtiers, sycophants, and all the moral refuse that naturally gathers round a weak throne. Hence, in the political language of modern Europe, it has come to signify the influence exercised on the state by secret and unaccredited councilors, in opposition to the opinions of the legitimate ministry, an influence which in Spain particularly is most pernicious. The word first obtained this meaning in the time of Ferdinand VII., who was excessively addicted to the unkingly habit of listening to the insinuations of the companions of his pleasures.

**CAMARINA**, an ancient city of Sicily, near the mouth of the Hipparus, 20 m. e. of Terranova. It was founded by Syracusans in the 6th c. b. c., but soon after was destroyed, because it had thrown off its allegiance. It was restored 495 b. c., but again depopulated, being finally established about 84 years later. In 258 b. c., most of its people were sold by the Roman consuls as slaves. It continued to exist until the 2d c., but since then has been in ruins.

**CAMAYEU** and **MONOCHROME** are terms by which painting in one color is designated. The ancients painted thus both in gray (*en grisaille*) and in red. Pictures of several tints, but where the natural colors of the objects are not copied, are said to be *en camayeu*. As one color generally prevails, we speak of blue, red, yellow, green camayeu. Polidori Caravaggio, for example, so overlaid his other colors with brown, that his works give the impression of monochrome paintings. Drawings in Indian ink, red and black chalk, pencil, etc., as well as engravings, may be said to be *en camayeu*.

**CAMBACÈRES**, JEAN JACQUES RÉGIS, Duke of Parma, and high chancellor of the French empire, under Napoleon, was b. at Montpellier, Oct., 18, 1753. In 1791, he was appointed president of the criminal court in his native place. Afterwards, as member of the national convention, he took a prominent part in sketching the new code of laws, and distinguished himself by his moderation. He denied the right of the convention to condemn the king, and though he voted him guilty, argued in favor of a reprieve. After the revolution of the 9th Thermidor (July 27, 1794), C. was elected president of the convention, and, as head of the committee of public safety, was active in procuring peace with Prussia and Spain. His enemies having succeeded in expelling him from office, he engaged himself in legal studies, and laid before the council of five hundred the sketch of a civil code which afterwards formed the basis of the *Code Napoléon*. In 1796 C. was for a short time made president of this council. After the changes made in the directory, he was made minister of justice, after the revolution of the 18th Brumaire (Nov. 9, 1799), was made second consul, and faithfully attached himself to the interest of Napoleon, by whom he was raised to the office of high chancellor of the empire, and in 1808 was made duke of Parma. He endeavored to dissuade Napoleon from the projected invasion of Russia, but in this instance his advice was vainly given. In 1813, when Napoleon took the field against the allies, C. was left as president of the regency, and in this capacity accompanied the empress to Blois, 1814. From this place he sent to Paris his vote for the abdication of Napoleon. During the hundred days, against his own will, he was made minister of justice, and president of the chamber of peers. After the second restoration, C. lived privately in Paris for some time; but in 1816 was exiled for having taken part in the execution of Louis XVI. In 1818, his civil and political rights were restored, and he returned to Paris, where he lived retired to the time of his death, Mar. 5, 1824. Among the men of the revolution, C. was one of the few whose activity was peaceable and truly progressive. His services in the establishment of law were great. His nature was mild and candid, and his intellect very acute.

**CAMBALUC**, or **CAMBALU'** (Mongol, *Kaan-Baligh*, "city of the Khan"), the city now known as Peking. It was captured in 1215 by Genghis Khan, and in 1264 adopted as the imperial residence by his grandson Kublai, who founded a new city near the old one of Yenking. The new city, Ta-tu, or "great capital," was a rectangle about  $5\frac{1}{2}$  by  $3\frac{1}{2}$  m., or more than 18 m. in circumference, surrounded by a colossal wall of mud, having an inner inclosure for the palace and gardens of the khan. There were 11 gates, and the streets ran towards them in direct lines. It was the residence of the Mongol emperors until the fall of their power in 1368. Soon afterwards the native dynasty gave it the name of Pe-king, or "north court," by which name it was known to the early Jesuit missionaries; but now the native name in ordinary use is King-Cheng or King-tu, signifying "the capital." The restoration of Cambaluc was commenced in 1409; the size was diminished, and the town made more nearly a square, and in this form now constitutes the "Tartar city" of Pe-king. The walls were finished in 1487. In 1544, the "outer city" was formed, the portion now known as "the Chinese city." The whole city under the name Cambaluc was made an archiepiscopal see by pope Clement V. in 1307.

**CAMBAY**, a city, district, and gulf at the n. w. extremity of the peninsula of Hindustan. — 1. C., the city, stands at the head of its gulf, and on the right bank of the Myhee, 76 m. to the n. n. w. of Surat. It contains about 31,400 inhabitants, having been at one time much more populous — ruinous palaces, mosques, and tombs, and an excavated temple of considerable pretensions, attest its former magnificence and extent. The main cause of its decay has been the gradual obstruction of its seaward navigation. — 2. C., the district, contains an area of 850 sq. m. It is attached to the presidency of Bombay. — 3. C., the gulf is in w. India between the Bombay coast and the peninsula of Kathiawar.

**CAMBER**, in ship-building, implies a slight arching or convexity upwards. A "cambered" ship is one in which the floor is higher in midships than at the stem and stern. — The name "camber" is also given to a small dock in a dockyard, for containing boats, and for loading and unloading timber.

**CAMBERT**, ROBERT, 1628-77; the first composer of French operas; organist of the church of St. Honore, and musical superintendent to Anne of Austria, the mother of Louis XIV. When Lulli was made musical superintendent to the king, in 1673, C. went to London, where Charles II. made him master of the band. His chief works were *Ariadne, or the Amours of Bacchus; Pomona; and The Pains and Pleasures of Love*.

**CAMBERWELL**, once a rural village, now a suburb of London, on the s. side of the Thames.

**CAMBERWELL BEAUTY**, *Vanessa antiopa*, one of the largest and most beautiful British butterflies, rare in Britain, although it has been found in many parts of the country, but common in the central and southern parts of Europe. The wings are of a deep brown color, with a band of black around the brown, and an outer band or margin of pale yellow, the black band containing a row of large blue spots, the yellow margin dappled with black specks, all the colors rich and velvety. The margin of the wings exhibits tooth-like angularities. The antennæ are terminated by a knob. The caterpillar feeds on the willow. It is black, with white dots and a row of large red spots down the back, and is rough with soft spines. — When Camberwell was more rural than now, and abounded in willows, this butterfly was sometimes taken there.

**CAMBIO**—**CAMBIST**. The former of these two words is the Italian for *exchange*; the latter, for a *money-changer*. Cambist is also used figuratively as the title of a book in which the moneys, weights, measures, etc., of various nations are given in the equivalents of some particular one. For instance, Kelly's *Unicursal Cambist* gives these in English, and the *Cambista Maltesa* in Italian.

**CAMBIIUM** (Lat. *cambio*, I change), in botany, a layer of mucilaginous viscid matter, particularly abundant in spring, interposed between the woody layers and the bark of trees and other stems. Delicate cells (*cambium cells*) are formed in it, which certainly fulfill important functions in the formation of new wood, although, notwithstanding much investigation by some of the greatest vegetable physiologists of our time, the nature of these functions is still very imperfectly ascertained. The medullary rays are connected with the C. cells, and these cells gradually elongate into the shape which belongs to those of woody tissue. The C. layer is found only in exogenous stems.

**CAMBO'DIA**, or CAMBO'JA (native name, *Kan-pou-chi*), an extensive country of the Indo-Chinese peninsula, now a protectorate of France, bounded on the s.w. by the gulf of Siam, on the s.e. by French Cochinchina, and on the n. by Siam. Area about 40,000 sq. m.; pop. about 1,500,000. The surface is mostly flat, and the soil fertile. There are extensive forests, which shelter elephants and deer; there are also wild cattle and ponies, and the rhinoceros abounds. Among the chief products are rice, betel, tobacco, indigo, sugar-cane, pepper, maize, cinnamon, and coffee. Its foreign trade is carried on largely through the port of Saigon in Cochinchina. The imports include salt, wine, tea, textiles, arms, and pottery; the exports, salt-fish, cotton, beans, tobacco and rice. Its principal towns are Phnomténh, the capital of the territory with a population of 50,000, and Kampot. The country is under the direct rule of a native king who acknowledges the protectorate of France. With Anam and Tonquin, it was united into a customs union in 1887 and, together with these two provinces and Cochinchina, is under the superior council of Indo-China, which gives advice as to the financial measures affecting the provinces.

**CAMBO'GE**. See GAMBOGE.

**CAMBON**, JOSEPH, 1754-1820; a French financier. He was a member of the national convention of 1792 and of the committee of safety of the next year; and in 1794 promoted the downfall of Robespierre. He is credited with having laid the foundation of the financial system of France. In 1816 he was exiled.

**CAMBORNE**, a t. of Cornwall, 11 m. n.w. of Falmouth. It is surrounded by very productive copper, tin, and lead mines. C. church has a stone inscription of the 10th century. Pop. '91, 14,700.

**CAMBRAI**, a city of France, in the department of the Nord, about 32 m. s.e. of Lille. It is situated on the right bank of the Scheldt, is strongly fortified and well built, with tolerably wide, but irregular streets, and many picturesque old houses. The

cathedral, archiepiscopal palace, town-house, and theater are among the principal public buildings. The city was greatly injured in 1793, when the revolutionists, among other vandalisms, razed the fine cathedral. They also disinterred the remains of Fénelon, who was archbishop here, and melted his lead coffin into bullets. A monument, however, by David the sculptor was erected (1825) in the new cathedral, in memory of the immortal author of *Télémaque*. The manufactures of the city are important, consisting of cambrie—so called from its manufacture here—linen-thread, lace, cotton-yarn, beet-root sugar, soap, starch, leather, etc. It has also a trade in agricultural produce. The pop. in 1891 was 24,100.

C. was known to the Romans under the name of *Camaracum*, and it was then one of the chief cities of the Nervii. It was fortified by Charlemagne, and was long governed by its own bishops, to whom Charles the bald ceded it. The celebrated league against the republic of Venice, which comprised the pope, the emperor of Germany, and the kings of France and Spain, was entered into here in 1508, and takes its name from the city. Here also were concluded treaties between the French king and the German emperor in 1529, and in 1724-25, between Charles VI and Philip V. of Spain. During 1815-18 it was the head-quarters of the British army of occupation.

**CAMBERIA**, a co. in s.w. Pennsylvania, drained by affluents of the Susquehanna and Alleghany rivers, and intersected by the Pennsylvania railroad; 680 sq. m.; pop. '90, 66,875. It is a high and broken table-land, with abundance of coal and iron. Agriculture is the chief business. Co. seat, Ebensburg.

**CAMBRIA**, the ancient name of Wales, the *Britannia Secunda* of the Romans. The name is derived from that of *Cimbri* or *Cymri*, by which the Welsh have always called themselves. See **BRETTA** AND **SCOTS**.

**CAMBRIAN SYSTEM**, the name given to the great series of sedimentary deposits which comes next in order of succession to the archæan system (q.v.). Whenever the base of these deposits can be seen, the beds are found to rest unconformably upon the archæan, or, as they are sometimes called, the pre-Cambrian rocks. There is some diversity of opinion as to the upper limits of the Cambrian. The name was introduced by Professor Sedgwick, by whom it was made to include a great thickness of strata, which most geologists now prefer to consider as forming the lower portion of the succeeding Silurian system. The British Cambrian rocks are best developed in South Wales, and are also well represented in Shropshire, etc. In Ross-shire they form the pyramidal mountains of Sullven, Canisp, and Coulmor. Cambrian strata with a few fossils have also been recognized in the southeast of Ireland, where they attain a thickness of 14,000 feet. Cambrian strata are for the most part unfossiliferous—organic remains being met with chiefly in the higher members of the system. The plant life of the period is very sparingly, if at all represented, for it seems doubtful if the fucoid-like markings are really tracings of plants, some being not improbably the tracks or trails of worms, etc. Animal life is surprisingly well represented, as by sponges (protospongia), sea-lilies (dendrocrinus), cystideans (protocystites), and star fishes (palæasterina). Crustaceans are plentiful—the modern groups of ostracods (water-fleas) and phyllopods (brine-shrimps, etc.) being represented. The most notable crustaceans, however, are the trilobites (q.v.), some of which were very minute and blind (agnostus), while others attained a length of one or two feet. The brachiopods belong almost exclusively to the "inarticulate" group—the most characteristic forms being *lingulella*, *discina*, and *obolella*. Four out of the five classes of mollusks now existing appear in the Cambrian, viz., lamellibranchs, pteropods, gasteropods, and tetrabranchiate cephalopods. The lamellibranchs and gasteropods, which attain their maximum in our own day, appear to have been but sparsely present in the seas of Cambrian times, but some of the gasteropods, such as the snail *pleurotomaria*, are types still living. The same is the case with some of the brachiopods. No indubitable traces of vertebrate life have yet been supplied by the Cambrian strata, nor have we any evidence of land or fresh-water forms, although it is quite possible that some of the mollusks may have lived in estuaries or brackish water. The general character of the sedimentary rocks, with their conglomerates, grits, etc., ripple marks, and animal tracks, is indicative upon the whole of shallow-water conditions; and the general absence of corals and of limestones points in the same direction. Although the fauna is less varied and abundant than that which has left its traces in the succeeding Silurian, yet we cannot but be struck with the fact that the Cambrian is relatively so varied. For here in the very oldest fossiliferous strata (if the archæan with its eozone be for the moment put out of account) we have most of the larger divisions of the animal kingdom represented. Hence believers in the doctrine of evolution are of opinion that the Cambrian fauna cannot possibly be the earliest, but must have been preceded by a long series of ancestors; and not only so, but that many forms of life must have existed in the Cambrian seas which have left no trace behind them. Cambrian rocks have been recognized in various other parts of Europe, as in central and southern Sweden, where the strata are not nearly so thick as in the British area. In central Brittany and in the Ardennes, they are likewise represented, and they also come to the surface in several provinces of Spain. The most important continental area, however, is that of Bohemia, where the



palaeozoic rocks and their fossils have been studied in great detail by Barrande. He divides the strata into several zones, his *primordial zone* having yielded many organic remains; especially trilobites belonging to characteristic Cambrian genera. In North America, the Cambrian or primordial system comprises an upper series of shales and sandstones (Acadian series) and a lower one of sandstones, etc. (Potsdam series). These strata have been recognized in Newfoundland, Nova Scotia, New Brunswick, and Canada, and in the states of Vermont, Massachusetts, and New York. They appear also in many different places along the Appalachian chain and in the region of the Rocky Mountains. The Cambrian rocks of Europe are frequently much altered and metamorphosed, while in North America they show, over certain wide areas, comparatively little alteration, the Potsdam sandstone especially being not unlike many "free-stones," so that it is much used for building purposes. Igneous rocks are associated with the Cambrian in various parts of Europe.

**CAMBRIC**, a general term applied to the finest and thinnest of linen fabrics. It is said to be derived from Cambrai, where such goods were first made. Some of the finest cambrics of the present day are produced in Switzerland. Scotch C. is really a muslin, being made of cotton with the fiber twisted very hard, to imitate real or linen cambric.

**CAMBRIDGE**, fourth city in size in Mass., and one of the shire towns of Middlesex co., on the Charles river, in lat. 42° 23' n., long. 71° 7' w., and opposite Boston, of which it is practically a suburb, being connected by seven bridges. It is entered by the Boston and Lowell, and Fitchburg railroads, and electric railroads connect with Boston and adjacent towns. Cambridge originally included the present towns of Lexington, Arlington, and the Brighton district of Boston. It was settled as New Town, in 1630, by Gov. Winthrop and others, who intended it to be the chief place in the colony, but found the peninsula of Shawmut (Boston) better adapted for commerce and for defense against the Indians. Re-settled in 1631, it received, in 1633, its first pastor and teacher, Rev. Thomas Hooker (q.v.) and Rev. Samuel Stone (q.v.), who removed with their congregation to Connecticut in 1636, having sold their lands to new emigrants. In 1637 the general court ordered that the college it had previously decided to found be established at Newtowne, and in 1638 that Newtowne become Cambridge. In that same year the first class began its studies, and the name Harvard College was given to the modest institution. See HARVARD, JOHN. During the time Boston was held by the British army (1775-76) Cambridge was occupied by the American army, and Washington assumed command in 1775 under a large elm, which is still standing. The city charter of incorporation was granted in 1846. Cambridge claims to have enlisted the first company of volunteers for service on the northern side on the outbreak of the civil war, and during that conflict it furnished 4588 men to the union army and navy.

Cambridge is irregular in shape; generally level in surface, with some marshy land along the river, and covers an area of about ten square miles. It embraces Old Cambridge and North Cambridge, both residence quarters chiefly, East Cambridge (formerly Lechmere's point), Cambridgeport and Mt. Auburn. Its climate is much like that of Boston. It has an excellent system of sewers, draws its water supply from Fresh pond and Stony brook, and has waterworks which cost about \$2,500,000. Its streets and avenues are shaded with beautiful old trees, and there are many handsome residences and well preserved colonial mansions, among them the house occupied by Gen. Washington and, later, the home of the poet Longfellow, fronted by a memorial park, and Elmwood, the dwelling of James Russell Lowell. The principal features of Old Cambridge are Harvard university (q.v.), with its ample grounds and many buildings, the buildings of the Protestant Episcopal divinity school, the First Unitarian church, the Shepard Memorial church (Cong.) commemorating Rev. Thomas Shepard (q.v.), and Christ church (P. E.). The city common contains a soldiers' monument, erected at a cost of \$35,000. Less than a mile from the college is the botanical garden of eight acres, filled with a great variety of trees, shrubs, and plants, especially of native species.

A cemetery of forty-one acres lies in the western part of the city, and twelve acres of Mount Auburn, one of the most beautiful places of burial in the country, are within the city limits. Cambridge has numerous churches, a Latin school, an English high school, a manual training school for boys, more than thirty public schools, the Dowse institute affording free lectures, two public libraries, and daily, weekly, monthly, and quarterly periodicals. The Riverside Press and the University Press, at Old Cambridge, are widely known; the latter, the oldest in the United States, having been founded in 1639. The chief industries besides printing, publishing, and bookbinding, and slaughtering and meat packing, are the manufacture of furniture, organs, pianos, and other musical instruments, soap and candles, foundry and machine shop products, brick and tile, carriages, glass, brushes, biscuits, chemicals, rubber goods, and telescopes. The capital employed in manufactures in 1890 was \$20,331,585; value of products \$35,975,069. East Cambridge has a large lumber trade. There are six national and four savings banks, and a fire insurance company. The city is governed by a mayor, a board of aldermen and a common council. The city hall is at Cambridgeport, and the court-house, jail, and principal manufactures at East Cambridge. The valuation of all property in 1896 was \$83,954,495; the city debt, \$3,913,634. Pop. 1790, 2112; 1830, 6072; 1850, 15,215; 1880, 52,740; 1890, 70,028.

**CAM'BRIDGE**, the chief t. of the co. so named, lies 48 m. n.n.e. of London. It takes its name from the river Cam, which was anciently called the Granta. By the Saxons, C. appears to have been known as Grantabrycge, which is found with many slight variations of spelling, and probably became abbreviated into Cantbridge. It is also supposed that C., and not the adjacent village of Grantchester, was the Grantacæster of the Saxons. There are, however, traces of a camp at Grantchester. In 870, the Danes ravaged the country hereabouts, and are said to have destroyed the town. King John, in the second year of his reign (1200 A.D.), granted a charter to the town, permitting it to have a guild of merchants, and in 1207, confirmed the burgesses in their privileges in perpetuity. In 1225, they paid a fine of 50 marks for having their liberties; and in 1237, Henry III. confirmed their charters. The town now sends one member to parliament, though until 1885, two. The university sends two members of its own. The population of the municipal borough in 1881 was 85,363, and in 1891 it was 86,983. C. has many churches belonging to the church of England, besides chapels belonging to the Baptist, Congregationalist, and other bodies. The most curious church is that of the Holy Sepulchre, which is one of the few in England that have a round tower. The town is not generally pretty or picturesque, but the gardens at the backs of the colleges, by the Cam, are extremely beautiful in the summer months.

**CAMBRIDGE**, ADOLPHUS FREDERICK, Duke of, 1774-1850; youngest son of George III., and uncle of Queen Victoria. He served as an ensign in the army, and was educated afterwards at Göttingen, returning home in his 20th year. In the Netherland campaign of 1793, he was taken prisoner by the French, but was almost immediately exchanged. Thereafter most of his public duty was in Hanover as governor and viceroy, until the separation of Hanover from the British crown in 1837.

**CAMBRIDGE**, GEORGE WILLIAM FREDERICK CHARLES, Duke of, b. 1819; field-marshal and commander-in-chief of the British armies; first cousin of Queen Victoria, son of Adolphus Frederick, duke of Cambridge; succeeded to his title July 8, 1850. In 1837 he was col., and in 1854, lieut.-gen. commanding the first division sent in aid of Turkey against Russia. He led the troops at Alma and at Inkerman. In consequence of ill health he returned to England, and in 1856 became acting commander-in-chief of the British army; in 1862, he was made field-marshal; in 1867 received the patent of commander-in-chief; and in 1895 was retired, and succeeded by Lord Garnet Joseph Wolseley (q.v.).

**CAMBRIDGE**, UNIVERSITY OF, one of the two ancient institutions of the kind existing in England. Overlooking several fabulous accounts of its origin, its true history may be said to begin at the opening of the 12th century. It was in 1110 that Joffrid, abbot of Croyland, sent over to his manor of Cottenham, near Cambridge, Gislebert, his fellow-monk and professor in divinity, with three other learned monks. These came over to Cambridge, and in a hired barn taught their sciences, and in a short space of time drew together so great a number of scholars, that in the second year of their coming no single building was able to contain them. Perhaps even this statement is doubtful. At any rate, when Alfred of Beverley was student here—viz., 1129 A.D.—there were as yet no public halls or hostels, but each one lived in his own hired lodging.

The first regular society of students was that of Peterhouse, founded in 1257. About this time, students began to live together in hostels, under the rule of a principal, at their own charges. These hostels were named after the saints to whom they were dedicated, the churches which they adjoined, or the persons who formerly built or possessed them. In the year 1280, there were as many as 84, and some of them contained from 20 to 40 masters of arts, and a proportionate number of younger students; but all these hostels decayed by degrees when endowed colleges began to appear. Trinity hostel survived all the rest, and continued to 1540. The hostels were the beginning of what may be called the *college system*, which distinguishes the sister-universities of Oxford and Cambridge from those of Edinburgh, London, and the continent. See UNIVERSITY.

It was between the latter part of the 13th and the close of the 16th c. that all these royal and religious foundations were endowed which now constitute the university. Hugh de Balsham has the honor of being the first benefactor in this way. Michael House was founded by Hervey de Stanton in 1324, and King's Hall by Edward III. in 1332, both of which were absorbed into Trinity college by Henry VIII., in 1546. Clare hall, as it used to be called, one of the earliest and now one of the prettiest colleges in Cambridge, was founded by the countess of Clare in 1326. Henry VI. has left himself an imperishable monument in the splendid foundation of King's college; and his queen, Margaret, commenced the foundation of Queens' college, which was added to by Elizabeth Widville, queen of Edward IV. Lady Margaret, countess of Richmond and Derby, mother of Henry VII., founded Christ's college and St. John's at the beginning of the 16th c., and also the divinity professorship named after her. Henry VIII. appropriated part of the spoils of the monasteries to the foundation of Trinity college, and queen Mary augmented the endowment. The five regius professorships were endowed by Henry VIII. Cambridge was frequently visited by the plague, and university proceedings were suspended by it in 1642 and 1666. In 1643, Cromwell took possession of the town, and the most eminent loyalists were expelled from the university. Almost all the colleges had sent their plate to the king at Nottingham. As might be expected, little

was done for the university in this troubled century; indeed no new colleges were added until the founding of Downing college in 1800.

The predominance of the religious element in the college discipline is to be attributed as much to the circumstances and manners of the times in which the colleges were founded, as to the piety of the founders themselves. There had been, from very early times, "religious houses," and these were in many cases united with the new collegiate foundations. There were, for example, the Dominicans, or preaching friars, whose house is now turned into Emmanuel college. The friars who lived in these convents were capable of degrees, and kept their "acts," or exercises for degrees, as other university men. There were, however, frequent quarrels between them and the other students. To the same cause is to be traced the condition of celibacy, upon which, with few exceptions, the fellowships were formerly tenable. These conditions had been considerably relaxed before the abolition of the restrictions as to marriage, and (except in the case of offices with clerical functions) holy orders was proposed by the statutes issued in 1881 by the Cambridge commissioners under the universities of Oxford and Cambridge Act (1877). These statutes take the place of those confirmed by the queen in 1858.

The present university statutes were confirmed by Queen Victoria, by order in council, July 31, 1858. The governing body is the senate, and the building where they meet is called the senate-house. All university laws are approved by an elected body called the council, before they are submitted to the senate. The executive powers are intrusted to a chancellor, high-steward, vice-chancellor, commissary, and assessor. The public orator is the voice of the senate upon public occasions. The proctors superintend the discipline and morals of all persons in *statu pupillari*; they are present at all congregations of the senate, read the "graces," and take the votes. The registry is responsible for the graces being offered in due form, and has charge of the university records. There are three terms in this university—the Michaelmas or October term, the Lent term, and the Easter term. To take an ordinary B.A. degree, a student must reside nine terms. The M.A. degree follows four years after. Dissenters are not excluded by the terms of the new statutes from taking degrees, except in divinity.

With respect to the admission of students, their university course, expenses, and proceedings in degrees, the following information may be useful: There are four classes of students—viz., *fellows commoners* and *noblemen, pensioners, sizars*, and the more distinguished students who are elected *scholars* on the foundation of their college. The first class are so called from their dining at the fellows' table; they wear silk or embroidered gowns, and pay heavier fees. The pensioners are the great body of students who are not on the foundation, and who pay for their own commons, viz., dinners in hall, etc., and for their chambers. The sizars are the poorer students, who are admitted at lower charges than the pensioners, but wear the same dress, and are no longer subject to the performance of menial offices as they once were. Some of the colleges, especially St. John's and Trinity, have very liberal endowments for the sizars, and very considerable pecuniary assistance is given to the more deserving of them, so that no youth of real ability, industry, and good character, need be deprived by poverty of the advantages of a university education. Non-collegiate students have lately been admitted to the university under special rules. The scholars are elected, by examination, from the pensioners and sizars; they are on the foundation of the college, have rooms and commons free, and other emoluments. The fellows are subsequently elected from the scholars and the students who have distinguished themselves in the tripos examinations. Vacancies are, as a rule, filled up from members of the college, but many fellowships are open to the competition of the whole university. The usual age of admission is from 17 to 20. Before a student can be admitted, he must obtain a certificate from some master of arts of the university of being sufficiently instructed in Latin, Greek, and mathematics; this certificate must be sent to the tutor of the college, along with the caution-money, which, in the case of a pensioner, amounts to £15.

Residence is commenced in the October term. It is usual, particularly at the larger colleges, to have the name entered on the college boards for a term or two previous; but this is not necessary now, as it used to be, in order to *keep* such terms with a view to the degree. When the undergraduate comes into residence, he is called a "freshman;" in his second year, a "junior soph;" in his third year, a "senior soph." The ordinary B.A., or bachelor of arts degree, may be taken in the ninth term of residence—viz., in the third June after coming up. The subjects of examination are partly fixed, partly variable. They are the Acts of the Apostles in Greek, one Greek and one Latin classic, *The History of the English Reformation*; *Euclid*, books i., ii., iii., iv., and propositions 1-6 of book vi.; together with certain parts of algebra, mechanics, and hydrostatics. The candidates for examination for degree are called questionists.

The successful candidates are arranged in a tripos. The following regulations for the triposes came into effect, 1882: the mathematical tripos is divided into three parts. The first two parts take place in June at the close of the third year, or ninth term of residence, and the successful candidates are arranged into Wranglers, Senior Optimes, and Junior Optimes, the members of each class being also placed in the order of merit. Only the Wranglers may proceed to the third part of the examination in the following January. The subjects for this part are divided into four groups, excellence in any one of which entitles to the highest honor. According to their success in this examination, the Wranglers are re-arranged in three classes, the names in each class being,

however, in alphabetical order. The classical tripos consists of two parts—the first, in general classical scholarship, and taking place at the end either of the second or of the third year of residence; the other, at the end of either the third or fourth year, and including, besides a further examination in pure classics obligatory on all candidates, a special knowledge of one or two of the following subjects: ancient philosophy, history, archaeology, philology. The examinations for degree are called “great go.” The previous examination, which comes in the second year of residence, is called “little go.” Students who intend to graduate in classical honors, are required to take mathematical honors in little go. The previous examination is one Greek and one Latin author, one of the gospels in Greek, Paley’s *Evidences of Christianity*, and elementary mathematics. After passing the “little go,” the examinations for the ordinary B.A. degree consist of a “general” and a “special” examination, the subjects in the former being similar to those in the little go. The special examination is, at the option of the student, in theology, moral or natural or applied science, or law. The following are the professors: Regius professors of laws, physic, Greek, Hebrew, and divinity, professor of moral philosophy, professor of chemistry, professor of anatomy, professor of modern history, professor of botany, professor of geology, Jacksonian professor of natural philosophy, Downing professors of law and medicine, professor of mineralogy, professor of political economy, professor of archaeology, professor of music, a lady Margaret, a Hulsean, and a Norrisian professor of divinity, two Arabic professors, a Sadlerian and a Lucasian professor of mathematics, a Lowndean and a Plumian professor of astronomy, Slade professor of fine art, professors of Latin, Sanskrit, international law, zoology, experimental physic, mechanism, Anglo-Saxon, surgery, music, physiology, and pathology. Degrees in honors are given in law and in natural and moral science, without requiring further proficiency in the normal studies of the place, classics and mathematics, than is ascertained by passing the little go. There are different fees at the different colleges in addition to the university fees. It will be sufficient to state, that for the B.A. and M.A. degrees, the fees amount to about £12 and £25 respectively.

The great prizes at the university are the *fellowships*, of which there are about 400, some open to all candidates without restriction, but conditions of tenure as to marriage and holy orders vary at different colleges. Their value varies from £100 to £800 per annum, and the senior fellowships are often £500 or more. There are also stipends attached to all the college offices—e.g., those of dean, bursar, steward, etc. The office of tutor is one of great honor and emolument. The chancellor gives annually two gold medals, open to the competition of all students qualified to be candidates for the classical tripos of the year. The members of parliament for the university give annually four prizes for the best dissertations in Latin prose.

The following is a list of the colleges in the order of their antiquity. A particular notice of each college will be found in its alphabetical place :

Name.	Founded.
St. Peter's college, or Peter-house.....	1257
Clare college.....	1326
Pembroke college.....	1347
Gonville and Caius college.....	1348
Trinity hall.....	1350
Corpus Christi, or Benedict college.....	1351
King's college.....	1441
Queens' college.....	1448
St. Catharine's college or hall.....	1473
Jesus college.....	1496
Christ's college.....	1505
St. John's college.....	1511
Magdalene college.....	1519
Trinity college.....	1546
Emmanuel college.....	1584
Sidney Sussex college.....	1598
Downing college.....	1800
Cavendish college.....	1873
Selwyn college.....	1882
Ayerst college.....	1884

The number of undergraduates in 1896 was 2,895 and there were 118 on the teaching staff.

Few of the colleges present an imposing façade to the streets—King's is, perhaps, the only one of which this may be said—but the quiet and picturesque beauty of the courts in the interiors is very pleasing. Dr. Whewell, the late master of Trinity college, built a new hostel in connection with Trinity, which is considered to be in very good taste. Amongst the other public buildings of Cambridge are to be mentioned the senate-house, where university examinations are held, degrees conferred, and all public business of the university conducted. The Fitzwilliam Museum is the finest of the modern additions to the university. Viscount Fitzwilliam bequeathed, in 1816, £100,000 South-sea

annuities, the interest of which was to build and support a museum. He left also a very valuable collection of books, paintings, etc., as a nucleus for future contributions. G. Basevi was the architect. The university library is a fine mass of buildings of different periods, and contains at present more than 200,000 volumes. The geological museum contains the original collection of Dr. Woodward, which, out of respect to the founder, has been kept in its original state, unmixed with more recent and vastly more numerous and interesting acquisitions. The university is indebted for many of these geological treasures to the late Prof. Sedgwick. The mineralogical room contains the valuable collections of the late sir A. Hume, Charles Brooke, and Henry Warburton. The Pitt Press is a Gothic structure built in honor of Mr. Pitt, who was educated at Cambridge. It contains the university printing-offices, which are very extensive. There is also a good anatomical museum.

There is a very good hospital, founded under the will of Dr. Addenbrooke in 1758. The observatory contains some very fine instruments, amongst which is a large equatorial telescope, presented by the duke of Northumberland in 1835. The income of the university is about £38,000, and the aggregate income of the colleges about £300,000 per annum.

The university examinations are now open to women, who are, however, debarred from taking degrees. They reside mostly in Newnham and Girton colleges. University college, Nottingham; St. David's, Lampeter; Firth, Sheffield, and the university of New Zealand are affiliated institutions, and students of not less than two years' standing, on being admitted to Cambridge, are deemed to have kept three of the terms required.

For the most recent information about the university studies, etc., the *Cambridge Calendar* for the current year should be consulted; for the history, biography, and antiquity, see Fuller's *History of Cambridge*; Dyer; Caius; Le Keux' *Memorials*; Cooper's *Annals*; Cooper's *Athena Cantabrigienses*; *Graduati Cantabrigienses*.

**CAMBRIDGE PLATFORM**, the system of church discipline agreed upon by the representatives of the New England churches at the synod held in Cambridge in 1648. In regard to doctrine they adhered substantially to the Westminster confession, though they did not impose that on the churches; but they did not accept that confession which was Presbyterian with respect to church order and polity, for regulating which they constructed the Cambridge platform, which declares that the form of church government is one and immutable, and prescribed in the word of God. According to this platform, the church in general consists of the whole company of the redeemed; but the state of the visible church militant was before the law economical, or in families; under the law, national; and since Christ, only congregational, or in local companies. In number a church ought not to be greater than may ordinarily meet together conveniently in one place, nor fewer than can conveniently carry on church work. The supreme power of the church belongs to Jesus Christ, who deposes extraordinary power to apostles, etc., and ordinary power to every particular church; officers are necessary to the well-being but not to the being of a church. Extraordinary officers, as apostles, are temporary; the ordinary, which are bishops (the same as elders or pastors) and deacons, are perpetual. A deacon's official acts are confined to temporal affairs. Any church may elect and depose its own officers, but in so doing the advice of neighboring churches should be sought. Ordination is the solemn putting a man into his office; it follows his election. In respect to Christ, the head, the church is a monarchy; in respect to the body or the brotherhood, it is like a democracy; in respect to the presbytery, or company of ministers, it is an aristocracy. Synods, though not necessary to the being, are useful to the well-being of the churches; but synods are not permanent ecclesiastical bodies. It is declared that local churches are of right distinct, equal, self-governed under Christ; yet that they should be gathered and should proceed in communion with each other; which communion they are to exercise by mutual care, by consultation, by admonition, by sharing in acts of worship, by needful transfer of members, by relief and succor. Synods have not power of church-censure and discipline, but are to declare the principles on which such acts are based, and their decisions are to be submitted to if found consonant with the word of God. The platform deals also, as its date required, with the relation of civil magistrates to affairs ecclesiastical. The platform is accepted and largely followed by the congregational churches as a useful guide, and as a strong presentation of the principles of church order given in the New Testament; but its enforcement upon any church as an authoritative rule is not attempted.

**CAMBRIDGESHIRE**, an inland co. of England, in lat. 52° 1' to 52° 45' n., long. 0° 31' e., and 0° 16' west. Its greatest length, from n. to s., is about 50 m., and its breadth 30 m., with an area of 820 sq. miles. Pop. '91, 188,961. About three fourths of the co. consists of arable land, meadow, and pasture, the rest being fens. The surface of C., except in the s., which is somewhat elevated and on the chalk formations, is marshy and flat, thinly wooded, and with villages and churches here and there on slight elevations, called "eys" or islands. The upper greensand, which in some places near Cambridge comes to the surface, yields in rich abundance the curious fossils miscalled coprolites (q. v.), which are of great value as an artificial manure. Their value is in some places equal to that of the land itself. The northern part of C. forms part of the Bedford level. The chief rivers are the Ouse, which crosses the middle of the county from w. to e., with its tributary the Cam; the Nene, which borders the co. on the n.; and the Lark. These are all navigable to a certain extent. C. is an agricultural county. In the higher parts, the land produces crops of beans and wheat.

**CAMBRONNE, PIERRE JACQUES ÉTIENNE**, 1770-1842; a French general of great renown for daring bravery, and a devoted servitor of Napoleon, whom he accompanied to Elba. He was in command of the imperial guard at Waterloo, and when entirely surrounded, and the battle utterly lost, he contemptuously refused to surrender, but fought until literally cut down. He was nearly killed, but lived to go to London, where he heard that in France he was charged with an attack upon his own country, to answer which he at once went to Paris and demanded a trial. This was granted, and he was honorably acquitted, and after the revolution of July he was restored to his rank in the army.

**CAMBUSLANG**, a parish and mining village in Lanarkshire, celebrated in the revivals of 1741. Pop. '91, 8300. See **WHITEFIELD**.

**CAMBYSES**, second king of the Medes and Persians, was the son of Cyrus and Cassandane, and succeeded his father in the monarchy, 529 B.C. C. is the Greek form of his name, the ancient Persian name is Kabujiya. In 525 B.C., C. invaded Egypt, defeated Psammenitus, the king of Egypt, at Pelusium, and in six months made himself master of the whole country. He meditated further conquests, but was not permitted to carry his designs into effect; the Tyrians, upon whom his maritime power depended, refused to serve him against the Carthaginians; an army which he sent to take possession of the temple of Jupiter Ammon, perished in the desert; and one which he led in person against the Ethiopians was compelled to return from want of provisions. Many stories are told of his cruelties to the Egyptians and his profanation of their religion. It is stated that he slew the calf which bore the marks of their god, Apis, that he violated their tombs, and that he put some of their leading men to death. On the authority of Herodotus, it is stated that the Egyptians thought that he had gone mad. These stories lack sufficient foundation, but it is probable that disappointment over his reverses caused him to govern with more sternness than before. A pretender to the Persian throne having appeared, C. marched against him, but died on the way, in Syria, 521 B.C.

**CAMDEN**, a co. in s.e. Georgia, on the ocean and the Florida border, n. of St. Mary's river, and including Cumberland island in the Atlantic; 769 sq. m.; pop. '90, 8178, includ. colored. It is level, with sandy soil, rice being the chief production. Co. seat, St. Marys.

**CAMDEN**, a co. in central Missouri, on the Osage river, and touched by the Atlantic and Pacific railroad, 692 sq. m.; pop. '90, 10,040, with colored. Co. seat, Lynn Creek.

**CAMDEN**, a co. in s.w. New Jersey, e. of Delaware river, traversed by several railroads, centring at Camden, the chief town, opposite Philadelphia; 220 sq. m.; pop. '90, 87,689. Co. seat, Camden.

**CAMDEN**, a co. in n.e. North Carolina, n. of Albemarle sound and e. of Pasquotank river; 250 sq. m., a portion of which is in the Dismal swamp; pop. '90, 5667, includ. colored. The Dismal swamp canal extends in this county to the Pasquotank at South Mills. Co. seat, Camden.

**CAMDEN**, a precinct and town, the latter the co. seat of Wilcox co., Ala., 33 m. s.w. of Selma; pop. in 1890, precinct, 2624, includ. colored; town, 545. The town is on an eminence 4 m. from the Alabama river, and is the centre of an important trade.

**CAMDEN**, a city and co. seat of Ouachita co., Ark., 82 m. s.w. of Little Rock, at the head of navigation on the Ouachita river, in a good situation for trade; pop. in 1890, 2571, includ. colored. The place was formerly a rendezvous for hunters.

**CAMDEN**, a town in Knox co., Me., 40 m. s.e. of Augusta and 8 m. n.e. of Rockland; on the w. shore of Penobscot bay. It contains churches, a bank, newspaper office, shipyards, and manufactories of ship's furniture, cars, car wheels, and woolen goods. It is connected with Boston by the Boston and Bangor S.S. line. The chief export is lime. Pop. '90, 4621.

**CAMDEN**, a city, port of entry, and co. seat of Camden co., N. J., on the Delaware river, opposite Philadelphia, with which it is connected by several lines of ferries. The Camden and Amboy railroad, incorporated in 1833, gave Camden its early importance as a railroad terminus. The city, which was chartered in 1828, lies on level ground, with streets crossing at right angles. It contains a city hall and county buildings, numerous churches, a hospital, three national banks, several benevolent institutions, excellent schools, and daily, weekly, and monthly periodicals. The water-supply is pumped from the Delaware river at Pavonia, one mile above the city. Camden is noted for its varied manufactures and for the immense market gardens on the outskirts. The principal industries are iron foundries, ship-building yards, lumber mills, and manufactories of chemicals, steel pens, and machinery. In 1890 the capital invested in manufactures was \$15,244,506, employing 10,362 persons, and produced goods valued at \$21,145,637. Camden is an important shipping point and railroad centre, being the terminus of the South Jersey Railroad, the West Jersey Railroad, and its branches, the Atlantic City Railroad, the Camden and Atlantic Railroad, and the Amboy Division of the Pennsylvania Railroad. Population in 1890, 58,313.

**CAMDEN**, a town and co. seat of Kershaw co., S. C., 33 m. n.e. of Columbia, on the Charleston, Cincinnati and Chicago and the South Carolina and Georgia railroads; pop. '90, 3533. Two battles were fought in the vicinity in the war of the revolution; the first

on Aug. 16, 1780, when the English commander Cornwallis defeated Gates and the revolutionary forces, mortally wounding Baron De Kalb; and a less important engagement a year later, when Greene and the Americans were repulsed by the English under Rawdon. In 1826 a monument was erected at Camden to the memory of De Kalb. During the war of 1861-5, the town was captured by the Union army, and nearly all the business part burned.

**CAMDEN, CHARLES PRATT**, earl of, a younger son of sir John Pratt, chief Justice of the court of king's bench in the reign of George I., was b. in 1714. Educated at Eton and Cambridge, he studied for the law, and was called to the bar in 1738. Not until 1752, however, when he defended a bookseller successfully against a government prosecution for libel on the house of commons, did C.'s prospects appear very promising; from this time his success was certain. In 1757, he was appointed attorney-general, and four years afterwards accepted a seat on the bench in the court of common pleas. Judge in the trial of Wilkes, he declared his opinion emphatically that the action of government in this case, by general warrants, was altogether illegal—an opinion which, chiming in with public sentiment at the time, made him the most popular of judges. In 1765, he was created baron C. of Camden place, Kent, by the Rockingham administration; to whose American policy, and to their treatment of Wilkes, notwithstanding, he offered constant opposition. The following year, when he was made lord chancellor, he did not abandon his principles; and four years after—the duke of Grafton being then prime minister—he supported an amendment made by Chatham on the government address, and resigned his place. His judicial career ended here; henceforth he was entirely a political character, and for more than 20 years took an active part against the ill-advised American policy pursued by lord North, and in discussions on the law of libel, in which he maintained the popular view. As a judge he is held in high estimation, though his manner was somewhat undignified. He was president of the council under Rockingham in 1782, and also under Pitt in 1783-94. He d. in 1794.

**CAMDEN, WILLIAM**, one of the most distinguished scholars and historians, and the most laborious and painstaking antiquary of the 16th c., was b. in London, where his father was a paper-stainer, in May, 1551. His education, commenced at Christ's hospital, was completed at St. Paul's school, and at Oxford. In 1575 he was appointed second-master of Westminster school; and it was while discharging the duties of this office that he undertook the work which has made his name famous, his *Britannia*, giving an account of the British Isles from the earliest ages, which, written in elegant Latin, was first published in 1593. It at once brought him into communication with the learned men of his time. Before 1607 the work had passed through six editions, being greatly enlarged and improved by the indefatigable industry of the author. The book, at first but a comparatively small single volume, has received much additional matter from other writers. The best known edition of C.'s *Britannia*, is that of Edmund Gibson, in English, 2 vols. fol. Of this great work of C., Bishop Nicolson said it was "the common sun whereat our modern writers have all lighted their little torches." In 1593, C. was appointed head-master of Westminster school; and four years later, he was made clarenceux king-at-arms, an appointment which gave him more time for the pursuit of his favorite studies. His other most important works are—*Annals of the Reign of Elizabeth*; *A Collection of Ancient English Historians*; *An Account of the Monuments and Inscriptions in Westminster Abbey*; and a *Narrative of the Gunpowder Plot*. He died in 1623, at the age of 72, and was buried in Westminster Abbey. Before his death he endowed a professorship of history at Oxford.

**CAMDEN SOCIETY**, founded in 1838 in honor of William Camden (q.v.) to publish early historical and literary remains. Up to 1893, 160 volumes had been issued.

**CAMEL**, *Camelus*, a genus of quadrupeds of the order *ruminantia*, of which only two species exist, both of great use to mankind. This genus is the type of the family *camelidae*, to which there belongs only one other genus, *auचना* (q.v.), including the llama, alpaca, etc. The whole number of species of *camelidae* is, therefore, very small, and they seem to belong originally to limited regions, both in the old world and in the new. To the peculiarities of these regions, they exhibit a wonderful completeness of adaptation. The family is regarded as forming a sort of link between the orders *ruminantia* and *pachydermata*. The dentition differs from that of all other ruminating animals, particularly in the presence of incisors or cutting teeth in the upper jaw; camels having also canine teeth in both jaws, and the llama and its congeners in the lower jaw of both sexes; and differences equally important appear in the feet, which have not the cloven hoof common to all the rest of the order—two short toes with separate hoofs adapted to one another—but two elongated toes, each tipped with a small nail-like hoof, the feet resting not upon the hoofs, but upon elastic pads or cushions under the toes.—In the camels, the toes are united by a common sole, thus resting upon one extended pad, instead of having each a separate one, as in the genus *auचना*; the broader expanse of the foot enabling the animals of the one genus more easily to traverse the loose sand of the desert, whilst the separation of the toes in the other is suited to the uneven surface of rocky heights. The camels are also distinguished by the females having four teats, whilst those of the other genus have only two; and by a hump or humps upon the back, of which the llama and its congeners exhibit no trace. The long neck, small head,

prominent eyes, and tumid and cleft upper lip, with considerable prehensile power, are common to both genera; but with much similarity of form, as well as of particular characters, the *camelids* of the Andes exhibit a gracefulness of outline which strongly contrasts with the gaunt angularity of those of the eastern deserts. Camels are indeed animals of uncouth appearance. Of the two species, that known as the Arabian C. (*O. dromedarius*) has only one hump on the back, whilst the bactrian C. (*O. Bactrianus*) has two. Some confusion has arisen from the occasional employment of the name dromedary as a designation of the former species, it being, however, more properly limited to a particular variety of that species, more slender and graceful than the ordinary variety, and of much greater fleetness. Buffon's notion, that the hump is a badge of servitude, and the consequence of harsh treatment throughout many generations, is singularly at variance with what we know of its uses. The hump on the C.'s back is a wonderful provision of nature, to adapt the animal to the endurance of long abstinence from food, or subsistence on very scanty supplies, to which it is often subjected in the desert, and without a capacity for which it would be comparatively of little value to man; and the wide deserts across which he journeys and transports his merchandise by its aid, would be altogether unpassable. The hump is, in fact, a store of fat, from which the animal draws as the wants of its system require; and the Arab is very careful to see that the hump is in good condition. Beyond its limit, the C. gets ill and dies; and when much exhausted, three or four months of repose and abundant food are necessary to restore it. The backbone of the C. is as straight as that of other quadrupeds.—Another very interesting adaptation to the desert is to be noticed in the thick sole which protects the feet of the C. from the burning sand, and in callosities of similar use on the chest and on the joints of the legs, upon which the C. rests when it lies down to repose, or kneels, as it does for various purposes, and is taught to do that it may be loaded, or that its rider may mount upon its back.—The wedge-shaped cutting-teeth of the lower jaw are also particularly fitted for browsing on shrubby plants, such as the desert produces—the camel's thorn, tamarisk, etc., which form a large part of the food of the C.; the eyes are furnished with long eyelashes, to protect them from the glare and from the drifting sand; whilst the exclusion of the sand from the nostrils is also provided for by a power of closing their oblique openings at will. But most interesting of all is the provision made for the C.'s endurance of long drought, by the lining of the inside of the second stomach, or honeycomb-bag, and of a portion of the first stomach or paunch, with great masses of cells, in which water is stored up and long retained. This store of water is well known to the Arabs, who, when sore pressed by thirst, sometimes avail themselves of it by killing some of the camels of the caravan.—The first stomach of the *camelids* is divided into two compartments by a muscular band—one of the points of difference between them and the other ruminants. Muscular bands, proceeding from this principal one, and intersected by other muscular bands, nearly at right angles, form the cells for containing water. It may be added here, that the senses both of sight and smell are extremely acute in the C., and that it is capable of discerning water at a great distance.

The Arabian C. carries twice the load of a mule. The Bactrian C. is sometimes loaded with 1000 or even 1500 lbs. weight, although not generally with so much. In the Soudan campaign (1884) a camel corps, consisting of soldiers mounted on camels, formed a part of the expedition. The use of the C. for the conveyance both of travelers and merchandise has won it the name of the *ship of the desert*. A caravan sometimes contains 1000, sometimes even 4000 or 5000 camels. The supply of food carried with the caravan for the use of the camels is very scanty: a few beans, dates, carob-pods, or the like, are all that they receive after a long day's march, when there is no herbage on which they may browse. The pace of the loaded C. is steady and uniform, but slow; it proceeds, however, from day to day, accomplishing journeys of hundreds of miles at a rate of about 24 m. per hour. Some of the slight dromedaries, however, can carry a rider more than 100 m. in a day. The motion of the C. is peculiar, jolting the rider in a manner extremely disagreeable to those who are unaccustomed to it; both the feet on the same side being successively raised, so that one side is thrown forward, and then the other.

The C. produces only one young one at a time, or rarely two. It lives 30 or 40 years.

The patience of the C. has been celebrated by some authors; and the cries by which it expresses its sense of injury when a heavy load is placed upon its back have been pathetically described. With all its general submissiveness, however, the C. is resentful of injury, and during the rutting season it becomes particularly vicious.

The flesh and the milk of the C. are much valued by the Arabs as articles of food. The dung is used for fuel, and it was from the soot of this dung that the sal-ammoniac, formerly imported from Egypt, was obtained by sublimation, whilst the sources from which that substance is now procured were unknown. The hair is used for the manufacture of cloth, some kinds of which are coarse, and others comparatively soft and fine. C.'s hair is also imported into Europe for the manufacture of the pencils or small brushes used by painters. The C. can now scarcely be said to exist anywhere in a wild state. It has lately been introduced into Australia.

A fossil species of C. (*O. Stivalensis*), larger than either of the existing species, has been discovered in the tertiary deposits of the Sewalik hills, in Hindustan.



**CAMEL**, a machine for floating ships over shoals and bars. A long, water-tight box, or caisson, nearly filled with water, is sunk on either side and attached to the ship, and then the water in the caissons is pumped out, adding additional buoyancy as they become empty. The C. is sometimes employed in raising sunken ships, and the principle is applied to dry docks in some instances.

**CAMELFORD**, a t. in the n.w. of Cornwall, near the source of the Camel (crooked brook), 14 m. w. of Launceston. It lies in a high and hilly tract near the moors. It has a small population. C. is said to have been the scene of a battle, in 542, between king Arthur and Mordred, his nephew, when both were slain. The West Saxons, under Egbert, had a battle with the Britons here in 823. The ruins of king Arthur's castle, Tintagel, stand on the high rocky coast, 4 m. n.w. of Camelford. Two m. n. of C. are the celebrated slate-quarries of Delabole, employing a large number of men. Macpherson, the author or translator of Ossian, was member of parliament for C. in 1791, but the reform act of 1832 disfranchised the borough.

**CAMELLIA**, a genus of plants of the natural order *ternstroemiaceæ* (q.v.), natives of China, Japan, and the n. of India—some of which are now among the most common and admired green-house shrubs in Britain and other countries too cold for their cultivation in the open air, receiving the same sort of attention which is bestowed on other florists' flowers, and with the same result, of an endless multiplication of beautiful hybrids and varieties. The best known and most esteemed is *C. Japonica*. Its leaves are ovate-elliptical, almost acuminate and serrate, shining; the flowers without stalks, mostly solitary, large, and rose-like. It is a native of Japan; and there and in China it has been carefully cultivated from time immemorial. In its wild state, it has red flowers; and the red single C. is much used by gardeners as a stock on which to graft the fine varieties, the flowers of which are generally double, and in many cases most completely so. Many of them are of Chinese or Japanese origin; many have been raised by cultivators in Britain, continental Europe, and America. Their colors are very various; and the varieties also differ much in the form and position of the petals. It adds to the value of the C. that its flowering time is in autumn, winter, and spring. By those who can afford the expense, entire houses are often devoted to the culture of camellias. Some cultivators are careful to protect them from direct sunshine, others recommend an opposite treatment in this particular; it is agreed by all that free access of air is of great importance, and that water must be given very liberally, yet with such caution that the soil may never remain soaked after the immediate wants of the plant are supplied. The cultivation of camellias in the windows of houses is often attended with disappointment, from the buds dropping off when almost ready to expand, which is generally owing either to a neglect or an excess of watering; an apparently slight mistake, either of the one kind or of the other, being very speedily productive of this evil. Too much heat at this time is also apt to cause the flower-buds to fall off. The C. flowers well, when the temperature is kept not very much above the freezing-point, but frost it cannot bear. In the s. of England, some of the varieties are occasionally trained to walls in the open air, receiving a little protection in winter. The proper soil for camellias is a loose black mold; a little sand and a little peat are often advantageously mixed with loam to form it. Camellias are often propagated by cuttings, often by layers; but the finest varieties very generally by grafting or by inarching. The single C. is also propagated by seed, and in this way the best stocks for grafting are procured.—Of the other species of C., the most hardy, and one of the most beautiful, is *C. reticulata*. The true tea plant is practically a camellia. See TEA.

**CAMELLIA'CEÆ**, an order of exogenous trees and shrubs in s. and e. Asia and South America; North America has four species. The tea plant and the camellia are specimens.

**CAMELOPARDE'LIÆ**. See GIRAFFE.

**CAMELOPARDE'LIÆ**, a constellation defined by Helvelius, between the pole-star, Auriga, Cassiopeia, and the head of Ursa Major, consisted of stars of the 4th and lower magnitudes, forming, in imagination, the shape of a giraffe.

**CAMELOT**, a steep hill in the parish of Queen's Camel, Somersetshire, England, five miles from Ilchester. The town possesses some remains of considerable antiquity and is identified by tradition with Camelot, one of the capitals of the legendary King Arthur (q.v.). Others state that Camelot was the name given in the mediæval romances to the city which grew up out of the permanent quarters of the second Augusta legion at Caerleon-upon-Usk. Camelot is frequently mentioned by Tennyson. See, for example *The Lady of Shalott*, *Morte d'Arthur*, and *Guinevere*.

**CAMEL'S HAIR** is woven by Persians and Arabs into material for tents and clothing. In early ages rough garments of this stuff were worn by monks and priests by way of penance. A fine article of camel's hair is used for pencils by artists.

**CAMEL'S HUMP**, or CAMEL'S BACK MOUNTAIN, one of the peaks of the Green Mountains, 4088 ft. high; 17 m. w. of Montpelier, Vt.

**CAMEL'S THORN**, *Alhagi*, a genus of plants of the natural order *leguminosæ* (q.v.), sub-order *papilionaceæ*, containing a number of herbaceous or half-shrubby species, natives chiefly of the deserts of the east, having simple leaves, minute stipules, racemes of red flowers, and jointed pods with one seed in each joint. These plants are of great

importance on account of the food which they afford for camels, where other vegetation is far from being abundant; and camels are particularly fond of them. *A. camelorum*, a herbaceous species, yields a kind of manna (q.v.), which appears in the form of drops, as of honey, on the leaves, and gradually hardens. A similar exudation is yielded by *A. nipalensis*, another herbaceous species; but it is not certain that the manna of Persia and Bokhara is produced, as has been alleged, by *A. maurorum*, a shrubby species 2 or 3 ft. in height, which certainly does not yield it in India or Egypt; the supposition that this exudation results from some peculiarity in the climate of Persia and Bokhara, being perhaps less probable than that of a mistake concerning species not very dissimilar.

**CAME'NÆ**, nymphs in Roman mythology, with prophetic powers, named Egeria, Carmenta, Antevorta, and Postvorta. The poets sometimes give the name to the nine muses.

**CAM'ENZ**, or **KAMENZ**, a t. in Saxony, 22 m. n.e. of Dresden; pop. '90, 7700. In 1742, the town was nearly destroyed by fire. Lessing was born here, and in 1826 a public hospital was dedicated to his memory.

**CAMEO** (Ital. *camei*). Gems cut in relief are called cameos, in opposition to those that are hollowed out so as to yield a raised impression, which are called *intaglios*. The term C., however, is applied more especially to those diminutive pieces of sculpture which are prepared from precious stones having two strata or layers of different colors, the undermost of which is left to form the background, the object to be represented being cut in the upper one. The stone generally used for this purpose by the ancients was the variegated onyx.

The art of cameo-cutting is of great antiquity. It is believed to have been of Asiatic origin, and to have been practiced by the Babylonians, from whom the Phenicians carried it into Egypt. From the Egyptians, it was transmitted to the Greeks, who brought it to great perfection; and latterly it was practiced very extensively, and more successfully than perhaps any other art, in Rome. To what extent the gems, commonly called Etruscan, are in reality early Greek, is a subject of dispute amongst the learned. It was not till a comparatively late period—the age following Praxiteles—that cameo-cutting became popular in Greece; and it was in the courts of the successors of Alexander that it was chiefly patronized. At this period, cameos were very extensively used, not only as personal ornaments, but in cups, vases, candelabra, and other objects of domestic luxury. Pateræ and other vessels were frequently worked out of a single stone, upon which were exhibited a whole series of figures of the most exquisite workmanship. Many of the antique cameos which have been preserved are wonderfully beautiful both in design and execution. The finest specimen in existence is said to be the Gonzaga C., formerly at Malmaison, now at St. Petersburg. It represents the head of a prince and his wife, probably Ptolemy I. and Eurydice. Winckelmann mentions a C. representing Perseus and Andromeda, in such high relief, that almost the whole contour of the figures, which are of the most delicate white, is detached from the ground. It belonged to the painter Mengs, and at his death was purchased by the empress Catharine of Russia. The only other gem which Winckelmann is disposed to rank with that just mentioned, is “the Judgment of Paris” in the cabinet of the prince Piombino at Rome. Of cameos of the Roman time, many fine specimens are to be found in the continental museums. The most celebrated C. in England is the “Cupid and Psyche,” in the Marlborough collection, by Tryphon, who is supposed to have lived in Macedon under the immediate successors of Alexander. The stones on which many of these cameos are cut are of surprising, and, in modern times, unequaled size and perfection. They are supposed to have been procured by the ancients through their oriental and African commerce. Cameos do not seem to have been made in mediæval times; but the art revived in Italy, under the auspices of the Medici; and the production of cameos, both in *pietra dura* and in shell, has there become a branch of art-manufacture of considerable importance. Impressions from antique cameos in glass, sulphur, porcelain, and other materials, are produced in many places; and for artistic purposes, possess all the value of the originals.

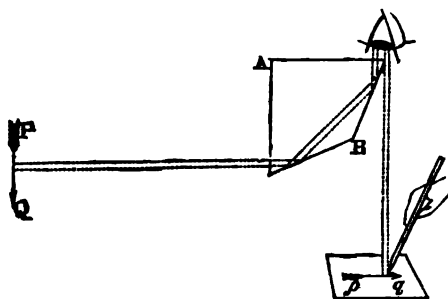
**Glass Cameos.**—The manufacture of cameos from artificial substances was not unknown to the ancients. One of the most beautiful specimens of an imitation of C. in glass is the famous Barberini or Portland vase, now in the British Museum. The ground is blue, the figures, which are in low relief, being of a delicate, half-transparent white. See **PORTLAND VASE**. Many fragments of the same kind of manufacture exist in other cabinets, but that which we are fortunate enough to possess is believed to be the only perfect example.

**Shell Cameos.**—The art of imitating cameos in shell, which has now attained to such perfection as to rival the delicacy and finish even of antique workmanship, and which is a process quite as artistical as their production from gems, is of modern invention. The shells, like the stones, chosen for this purpose, are such as possess layers of different colors. The most useful are the *bull's mouth*, the under layer of which is red, resembling the sardonyx; the *black helmet*, which has a dark onyx ground; and the *queen's conch*, of which the ground is of a pinkish hue. These shells have three strata, the undermost of which forms the ground, the figure being sculptured in the second, and the third serving to mark the hair, wreaths, armor, and other more prominent objects. The portion of shell having been prepared of the requisite size, form, and thickness by various

mechanical means, it is fixed by some adhesive substance—usually rosin—to a small block of wood, of such form and thickness as to be conveniently grasped by the artist in his left hand. The outline of the object or objects to be represented is then sketched with a pencil, and, in the case of portraits, is usually copied from a previous pencil sketch on paper. The pencil-marking on the shell is then followed with a scratch-point, and the surrounding white substance is removed by means of files and gravers. This latter process, which is more mechanical than the rest, is usually performed by an assistant. The artist then proceeds slowly and carefully to work out his subject by the use of smaller tools; those used at last for deepening the finer lines being scarcely larger than ordinary darning-needles. The manufacture of shell-cameos in Rome commenced about 1806, and is said to have been of Sicilian origin. The art was at first confined to Italy; but during the last 35 years, it has been carried on in Paris to a great extent. A large proportion of the whole cameos manufactured in France are imported into England, and many of them are mounted as brooches, and exported to the United States and the British colonies. See *illus.*, **DIAMONDS, ETC.**, vol. IV.

#### CAMERA. See PHOTOGRAPHY.

**CAMERA LUCIDA**, an optical instrument constructed of various forms, and for various purposes. Dr. Wollaston's C. L., intended to facilitate the perspective delineation of objects, consists of a small quadrilateral prism of glass, of which AB in the



Camera Lucida.

annexed figure is the perpendicular section, held in a brass frame, which is attached to an upright rod, having at its lower end a screw-clamp, to fix it to the edge of a table. The prism being at the height of about a foot from the table, has its upper face horizontal. Two of its faces, as in the figure, are at a right angle at A; the contiguous faces make respectively with them angles of  $67\frac{1}{2}^\circ$ ; so that the remaining obtuse angle at B contains  $135^\circ$ . Rays coming from an object PQ, and falling nearly perpendicularly on the first surface, enter the prism, and undergo total reflection at the contiguous surface (see **DIOPTRICS**); they then fall at the same angle on the next surface, and are totally reflected again; finally, they emerge nearly perpendicularly to the remaining surface. An eye, as in the figure, then receives the emergent pencil through one part of the pupil, so that an image, *pq*, of the object is seen projected upon a sheet of paper upon the table. The rays from the drawing-pencil passing the edge of the prism, enter the other part of the pupil; and the pencil and image being seen together upon the paper, a sketch of the latter can be taken. There is, however, a practical difficulty—the image and the drawing-pencil are at distances sensibly different from the eye, and so cannot be seen together distinctly at the same time. To obviate this, a plate of metal, with a small aperture as an eye-hole, is placed at the edge under the eye, so that the rays through the prism, and those from the drawing-pencil, which both pass through the eye-hole, form only very small pencils. By this, the difficulty is greatly diminished. It is still, however, difficult to use the instrument satisfactorily; and though many acquire great readiness in its use, others have never been able to attain the same facility. The instrument is remarkable for its small bulk and portability. A good one will pack in a box 8 in. by 2, and  $\frac{1}{2}$  in. deep. Besides this form of the C. L., which is the most common, there are others. Its simplest form is merely a piece of smooth glass fixed at an angle of  $45^\circ$  to the horizon. An image from a horizontal object falling on this glass will be perfectly reflected, and that in the vertical, so that the eye looking vertically down will see the image, and, owing to the transparency of the glass, the artist will be able to trace it out upon paper below. In this case, however (see **CATOPTRICS**), the image will be inverted.

**CAMERA OBSCURA** (literally, a dark chamber), an instrument invented by Baptista Porta in the 16th century. It is known in its simplest form as a familiar toy, consisting of a rectangular box, furnished at one end with a lens whose focal length is equal to the length and depth of the box; at the opposite end of which a plane reflector is placed at an angle of  $45^\circ$ , which throws the image of any objects to which the lens may be directed on a piece of ground-glass on the top of the box in a non-inverted position, so that they may be viewed or sketched from as in nature.

The C. O. being now an indispensable article in the practice of photography, has received a number of recent improvements, which make it rank as a scientific instrument. The principle, however, involved in the simplest and most refined forms is the same, and may be illustrated and made intelligible by the following experiment: Let a small hole be bored in a window-shutter, and the room be darkened. If, now, the beam of light entering the room by this hole be intercepted by a sheet of white paper,

held at a small distance from the hole, an inverted image of objects without will be seen upon the paper. By placing a small convex lens over the hole, this image is rendered much more distinct, or *sharp*, in photographic language. Moreover, it will be found that, at a certain distance from the hole, the image attains a maximum degree of sharpness; and that if the paper be removed from this point to any position either nearer to the hole or further from it, the image becomes indistinct and confused. At the point of greatest distinctness, the image is said to be *focused*. Such being the principle of the camera, it is evident that in practice the instrument may assume many forms, provided always that it consists of a darkened box or chamber having a hole at one end for the insertion of a lens, or combination of lenses, and at the other a screen, generally made of ground-glass, on which to receive the image.

The body of the instrument may be made of any opaque substance; the tube or tubes are generally formed of brass, and contain one or more lenses; there is the obscured or ground-glass, upon which the image is thrown for the purpose of adjusting the focus; and the rack behind, by means of which, and the double sides of the camera, the body of the instrument may be lengthened or shortened till the image on the ground-screen is accurately focused. This rack is most frequently placed upon the tubes carrying the lenses. The interior of the whole apparatus is blackened, to prevent reflection of the rays falling on their sides, and to impart greater distinctness to the picture.

The *camera-slide* is a thin, dark box, and is used for conveying a sensitive plate from the operating-room to the camera, and back again after exposure. It consists of a rectangular frame, made to fit exactly into the back of the camera when the focusing-screen is removed. At the back is a hinged door, by means of which the plate is introduced into the slide; and in front is a shutter, which is pulled up when the plate is to be exposed, and shut down after the time requisite for the action of the light upon the plate has expired. It must be constructed so that, when substituted for the focusing-screen, the surface of the prepared plate, which is intended to receive the image, shall correspond exactly in distance from the lens with the ground-surface of the focusing-screen. The plate rests upon projections of silver wire in the corners of the slide; and the same slide may be used for plates of different sizes, by introducing into it thin frames of suitable dimensions also furnished with silver-wire corners.

Photographic cameras are generally required for one of three purposes—viz., portraits, landscapes, or copying; and for each of these it is necessary to make suitable modifications in the construction of the instrument. A camera has, however, been recently contrived which combines within itself the conditions necessary for all contingencies. It is called Martin's universal portrait, landscape, and copying camera, and consists, primarily, of a base-board, 80 in. long and 11 in. wide, divided into three pieces, and hinged together by means of broad brass hinges, so as to diffuse the bearing as much as possible, and bolted together when in use by sliding panels of mahogany, extending across the entire width of the base-board. This base-board being grooved on its outer edges, allows the sliding portions of the camera to be moved from one end to the other, so as to alter the relation between object, lens, and image *ad infinitum*.

**CAMERA'RIVUS**, JOACHIM—originally, *Liebhart*, which name he changed into C., because his forefathers had been *Kämmerer* (chamberlains) at the court of the bishop of Bamberg—was born at Bamberg, April 12, 1500, and died at Leipsic, after a life devoted to literature, April 17, 1574. He was by nature earnest and taciturn; but the extent of his knowledge, his sobriety of opinion, strength of character, and, when he pleased, overpowering eloquence, won for him the esteem of all his contemporaries. His works, of which several still remain valuable, include an excellent biography of Melanchthon, and a collection of letters by this reformer; also annotations on Cicero's *Questiones Tusculanae* (1525); *Elements of Rhetoric*; *Commentarii Linguae Graecae et Latinae* (1551); and *Epistolae Familiares* (1553-95), giving interesting notices of his times.

**CAMERA'RIVUS**, RUDOLPH JAKOB, 1665-1721; a German botanist and physician, professor of medicine and director of the botanic garden at Tübingen. He was the first to observe and establish the sexual theory of plants.

**CAMER'INO** (ancient *Camerinum*), a t. of central Italy, in the province of Macerata, situated on a hill at the foot of the Apennines, 41 m. s.w. of Ancona. It has a cathedral, occupying the site of a temple to Jupiter, a university, and some manufactures of silk. Its bishopric dates from the 3d c.; and it was made an archiepiscopal see in 1787. Pop. 12,000.

**CAMERLENGO**, or **CAMERLINGO** (Ital., chamberlain), the cardinal who controls the finances and the secular interests of the pope. During a vacancy in the Holy See, he is sole head in things temporal, and presides over the apostolic chamber or palace. In things spiritual, however, he is assisted by the other cardinals. The cardinal camerlengo is one of the four great officers of the pope, the titles of the other three being *cardinal vicar*, *cardinal patron*, and *cardinal penitentiary*.

**CAMERON**, a parish in s.w. Louisiana, on the gulf of Mexico; surface low, with many swamps; area, 1552 sq. m.; pop. '90, 2828, with colored. Judicial seat, Cameron.

**CAMERON**, a co. in n. w. Pennsylvania, traversed by the Pennsylvania and other railroads; 382 sq. m.; pop. '90, 7238. Productions agricultural. Co. seat, Emporium.

**CAMERON**, a co. in Texas, on the Gulf of Mexico and the Rio Grande; 1960 sq. m.; pop. '90, 14,424, with colored. The portion along the Rio Grande is very fertile; the remainder is grazing land. Co. seat, Brownsville.

**CAMERON**, DONALD, a Scottish highland chief who fought for the pretender and was wounded at Culloden, but escaped to France. He was the "Lochiel" of Campbell's poem.

**CAMERON**, JAMES DONALD (usually called "DON" CAMERON), b. Harrisburg, Penn., 1833; eldest son of Simon; graduated at Princeton college in 1852, and since largely engaged in iron, coal, and manufacturing industries of his state. As president of the Northern Central railroad, he did great service to the union cause during the war. In 1876, he was appointed secretary of war, and in Mar., 1877, succeeded his father as U. S. senator. In 1879, he was chosen chairman of the republican national committee in place of Zachariah Chandler, deceased. This position he resigned in 1880, but retained his seat in the Senate until 1896, when he announced his intention to retire from public life. In 1895 he was among those who advocated the free coinage of silver.

**CAMERON**, JOHN, a famous scholar and divine, was b. at Glasgow about the year 1580, and educated at the university of that city, where, in his 20th year, he held an appointment as reader in Greek. In 1600, he set out to travel in France, where his ability and erudition secured for him a philosophical professorship in the university of Sedan. He afterwards acted as a Protestant clergyman at Bordeaux, and on the death of Gomarus, was appointed to the divinity chair in the university of Saumur, an appointment he held until 1620. Returning to Britain, he was appointed professor of divinity at Glasgow; but in less than a year he returned to Saumur; thence to Montauban, where he received a divinity professorship. Here his opposition to the party who advocated a civil war made him many enemies, by one of whom he was stabbed in the street; and he died from the effects of the wound in 1625. He was considered one of the best scholars of his time; in Biblical criticism, he was inclined to be perverse; where there was a difficulty, he usually chose the opposite view to that held by other divines, especially Beza. His theological opinions were of a somewhat lax character, his works being said to be the foundation of Amyraut's doctrine of universal grace.

**CAMERON**, RICHARD, a Scottish Presbyterian preacher in the 17th c., who suffered death for the cause he espoused, and from whom the religious sect ordinarily called Cameronians (q. v.) has been named. C. belonged to the extreme party, who held by the perpetually binding obligations of the solemn league and covenant (see COVENANTS), which were set aside at the restoration of Charles II. Along with some others, he strenuously resisted those measures that reinstated the Episcopal church in Scotland, and that proscribed the meetings for public worship of unauthorized religious bodies. Contrary to law, he persisted in preaching in the fields, and became obnoxious to government, to which, indeed, he finally assumed an attitude of defiance. In June, 1680, he, in company with about twenty persons of equal zeal, well armed, entered the town of Sanquhar; and in the market-place they formally renounced their allegiance to Charles II., who had so grossly abused his power, and declared war against him and all his adherents. After this act they retired to the hills between Nithsdale and Ayrshire, where they succeeded in evading capture for a month, though a price of 5,000 merks had been set upon C.'s head by government, and 3,000 upon the heads of the others. On the 20th July, 1680, however, they were surprised by a vastly superior force in Aird's Moss, and after a brave fight, C. was killed. His hands and head were cut off, and fixed upon the Netherbow Port, Edinburgh.

**CAMERON**, SIMON, b. in Lancaster co., Penn., 1769. In 1845, he was elected by the democrats to the U. S. senate, but joined the republicans on the organization of that party, and was by them re-elected to the senate in 1856. In 1861, he was secretary of war, and in 1863 minister to Russia. Twice again he was chosen senator, in 1866 and in 1872, and was succeeded in that office in 1877 by his son, James Donald. He was one of the leading financiers and business men of the state. He d. 1889.

**CAMERON**, VERNEY LOVETT, an African traveler, son of the Rev. J. H. L. Cameron, vicar of Shoreham, Kent, was b. in 1844. He entered the navy in 1857, and served some time on the e. coast of Africa. In 1873, he took charge of an expedition to relieve Livingstone, his orders being to join him by the nearest route. He started from Bagamoyo in Mar., and in Aug., at Unyanyembe, met Livingstone's followers bearing his remains to the coast. After making arrangements for their safe arrival, he proceeded to Ujiji, where he found some of Livingstone's papers and a map, which he forwarded to Zanzibar. He then made a survey of Lake Tanganyika, which he found to be disconnected with the Nile system. In the belief that the Lualaba was the upper waters of the Congo, he resolved to follow its course to the w. coast; but owing to the hostile interposition of the native chiefs, was prevented from verifying a conviction, the correctness of which was soon afterwards demonstrated by Stanley. Taking a more southern route, he reached the Portuguese settlement of Benguela, on the w. coast, in Oct., 1875, whence he returned to England. An account of his travels, which contains a vast number of valuable scientific observations, was published in 1877 in 2

vols., under the title of *Across Africa*. C. was made a companion of the bath; and raised to the naval rank of commander. He d. in 1894.

**CAMERON HIGHLANDERS** (the Queen's Own Cameron Highlanders), the designation given to the 79th regiment of infantry in the British service, in consequence of the corps having been raised by Allan Cameron of Erroch in 1793. Originally, it consisted of 1000 men, but a second battalion was added in 1804. This gallant regiment, which wears the Highland garb, performed distinguished services in the Peninsula and at Waterloo, and in the chief warlike struggles of more recent times.

**CAMERO'NIAN REGIMENT**, the 26th regiment of infantry in the British service, so called from having had its origin in a body of Cameronians (q.v.) during the revolution of 1688. Taking advantage of their zeal and courage, the convention which sat at Edinburgh induced a number of them to assist in the revolution, which it was imagined by some was to re-establish the reign of the covenants. They were induced to enlist on the understanding that the special object of the corps was "to recover and establish the work of reformation in Scotland, in opposition to popery, prelacy, and arbitrary power, in all the branches and steps thereof, till the government in church and state be brought to that luster and integrity which it had in the best of times." (See Burton's *History of Scotland*, vol. i. p. 49.) Thus was formed the celebrated C. R., with the youthful lord Angus as col., and William Cleland as lieutenant-col. and actual commander. Under Cleland, not yet in his 30th year, the regiment was sent northwards to quell the insurrection, after the fall of viscount Dundee. Surrounded by from 4000 to 5000 Highlanders, the Cameronians, only 800 strong, gallantly defended themselves during a whole day in Dunkeld, Aug. 21, 1689. In this terrific struggle, the brave Cleland was killed. Considering the issue of the revolution, they had been entrapped into military service, and their employment on foreign service afterwards greatly scandalized the Cameronian sect. The regiment has ever done credit to its origin; being distinguished alike for gallantry and for good conduct.

**CAMERO'NIANS**, the religious sect in Scotland popularly named after Richard Cameron (q.v.). Its official designation, however, is that of Reformed Presbyterians. No doubt, the principles of the body are those for which Cameron contended and died; but not till after 1688 did the small body of Presbyterians, who insisted upon the restoration of the civil and ecclesiastical polity of 1688 to 1649 in opposition to the revolution settlement, assume a distinct form. According to the solemn league and covenant, ratified by the parliaments of England and Scotland, and also by the assembly of divines at Westminster in 1643, presbyterianism was to be maintained in the kingdoms of England, Scotland, and Ireland, and popery, prelacy, superstition, heresy, schism, etc., were to be extirpated. As a measure of pacification, presbyterianism was established in Scotland by act of parliament, 1690; but it was of a modified kind, rendering the church a creature of the state, more particularly as regards the calling of general assemblies. Equally to the disgust of the extreme party referred to, prelacy was confirmed in England and Ireland, and there was a general toleration of heresy—i.e., dissent. In sentiment, if not in form, therefore, this party repudiated the government of William III. and his successors, and maintained the perpetually binding obligations of the covenants. Unquestionably, these C. acted under strong convictions, and only desired to carry out to a legitimate issue theoretical principles of the church of Scotland which, for prudential considerations, have been practically in abeyance; and it is in the standards of this sect that we find a true embodiment of the tenets held by the great body of English and Scotch Presbyterians of 1643. Although thus an elder sister of the existing church of Scotland and all its secessions, it was with some difficulty that, after the revolution, it organized a communion with ordained ministers. The steadfastness of members was put to a severe trial by the defection of their ministers; but in 1706, after their faith and patience had been tried for 16 years, they were joined by the Rev. John M'Millan, from the Established church; and shortly afterwards, by the Rev. John M'Neil, a licentiate of the same church. To confirm the faith of members, and give a public testimony of their principles, the covenants were solemnly renewed on Auchensauch hill, near Douglas, in Lanarkshire, in 1712. The subsequent accession of the Rev. Mr. Nairne enabled the C. to constitute a presbytery at Braehead, in the parish of Carnwath, on the 1st of Aug., 1743, under the appellation of the Reformed presbytery. Other preachers afterwards attached themselves to the sect, which continued to flourish obscurely in the w. of Scotland and n. of Ireland. For their history and tenets, we refer to the *Testimony of the Reformed Presbyterian Church* (Glasgow, John Keith, 1842). Holding strictly to the covenants, and in theory rejecting the revolution settlement, the political position of the C. is very peculiar, as they refuse to recognize any laws or institutions which they conceive to be inimical to those of the kingdom of Christ; from which cause many of them formerly isolated themselves from general society, and refused several of the responsibilities and privileges of citizens. In 1860, there was an attempt on the part of some of the kirk-sessions to prevent the members becoming volunteers, on account of the oath of allegiance which required to be taken. On the question coming before the synod, it was decided (1863) that excommunication for taking the oath should cease. In consequence of this decision, 10 or 12 congregations seceded. In 1876, the larger body of the Reformed Presbyterians, consisting of about 45 congre-

gations, was formally united to the Free Church of Scotland, so that the distinctive features of the Cameronians are now represented by the few congregations which seceded in 1863.

**CAM'ERONITES**, a sect in France, followers of John Cameron of Scotland. They are moderate Calvinists, and assert that the will of man is determined only by the practical judgment of the mind; that the cause of men's doing good or evil proceeds from the knowledge that God infuses into them; and that God does not move the will physically, but only morally, by virtue of its dependence on the mind. This peculiar doctrine of grace and free-will was adopted by many eminent teachers who thought Calvin's doctrine too harsh.

**CAMEROON**, a German protectorate on the west coast of Africa, extending 199 miles along the coast of the bight of Biafra, between the Campo river and the Rio del Rey. It is a fertile region, and among its commercial products in 1895 were caoutchouc, palm oil, ivory, ebony, and cacao. The natives belong to the Bantu race (q. v.), and an attempt made in 1884 by the kings of the coast tribes to prevent the tribes of the interior from trading directly with Europeans led to an appeal to England and then to Germany, which forthwith annexed the country. Estimated area, 191,130 sq. m.; pop. 3,500,000, of whom 230 were whites in 1895.

**CAMEROON**, a river of Upper Guinea, Africa, which enters the bight of Biafra from a n.e. direction, in about lat. 4° n., long. 9° 40' e., by an estuary some 20 m. in breadth. For 40 m. upwards its breadth averages nearly a quarter of a mile, its depth varying in the dry season from 2 to 20 feet.

**CAMEROONS'** are mountains on the w. coast of Africa between 8° 57' and 4° 25' n., and 9° and 9° 30' e.; a volcanic mass covering 700 sq.m., the highest about 13,700 feet. They touch the gulf of Guinea on the w. and south. Capt. Burton ascended these mountains in 1861, finding the sides for about 4000 ft. covered with a dense growth of palms, acacias, figs, cardamoms, cabbage-trees, oaks, ferns, and bamboos. Higher up were smaller trees, and at 4580 ft. there began a labyrinth of lava streams and fields of slag. At about 8000 ft., craters appeared, of which there are nearly 30. The natives tell of an eruption in 1838.

**CAME'TA**, a t. of Brazil, on the Tocantins, which joins the estuary of the Amazon from the south. It has a fertile district attached to it, which is estimated to contain 20,000 inhabitants.

**CAMILLA**, in Roman fable, a virgin wonderfully swift of foot who aided Turnus against Æneas. She was said to be a daughter of king Metellus.

**CAMIL'US**, **MARCUS FURIUS**, a celebrated Roman patrician who first makes his appearance as consular tribune, 408 B.C. His military career was a series of unbroken successes, according to the accounts which have come down to us; but these accounts have been shown by Niebuhr to possess a considerable admixture of mythological or poetic fiction. In 396, C. was made dictator, during the Veientine war, in which he mined and captured the city of Veii; but the proud splendor of his subsequent triumph offended the Roman populace, who were still further displeased when C. demanded a tithe of the spoils of Veii, in order to fulfill a vow made to Apollo, on condition of victory. In 394, C. was again elected consular tribune, and besieged the Falerii, who after bravely defending themselves, were led by a magnanimous act of C. to yield unconditionally. Afterwards, C., being accused of peculation, and foreseeing certain condemnation, banished himself from Rome, 391, and lived in retirement at Ardea, until Brennus, at the head of his wild Gauls, had swept through Etruria, and captured and destroyed the whole of Rome except the capitol. C. was now recalled, and appointed dictator a second time. He achieved a decisive victory over the invaders, rebuilt Rome, and obtained new victories over the Volsci, and others. In 386 B.C., he was elected dictator for the third time, but refused the office. In 381 B.C., C. was victorious in the war of Rome against Præneste and other Latin towns; and in 368 B.C., he was elected to his fourth dictatorship, but abdicated during the same year. In 367 B.C., when war broke out with the Gauls, C., though 80 years old, accepted the dictatorship for the fifth time, defeated the barbarians near Alba, and made peace between patricians and plebeians. After this, he erected near the capitol a temple to Concord, and, having retired from public life, died 365 B.C., of the plague, lamented by the whole Roman people.

**CAMIL'US** and **CAMILLA**, applied in ancient Rome to the boys and girls who shared in sacrificial ceremonies. If they were designed for the priesthood, it was necessary that their parents should be still living and free-born.

**CAMINATZIN'**, or **CACUMAZIN**, d. 1521; king of Mexico; nephew of Montezuma. He was one of the victims of the treachery of Cortes, against whom he had declared war. At the instigation of Cortes, Montezuma invited his nephew to the city of Mexico to make a reconciliation with the invaders. He replied that he would enter that city only to destroy the enemies of the country. Still influenced by Cortes, Montezuma had the young prince seized, but his captors permitted Cortes to get possession of him, and he was kept a prisoner until the expulsion of the Spaniards. He probably died soon after the siege of Mexico.

**CAMISARDS**, the name given to the peasantry of the Cevennes, a mountainous region in s. France, who for several years from 1702 kept up an organized military resistance to the *dragonnades*, or conversion by torture, death, and confiscation of property, by which, after the revocation of the edict of Nantes, the Roman Catholic leaders endeavored to enforce their authority in all the Huguenot districts. The name is of doubtful origin; some say it was from *camise*, a white shirt or frock, outwardly worn by the peasants; others that it was from *camisade*, a night attack; and still others, from *camis*, a road runner. The C. were also called *barbets* (or water dogs, a term also applied to the Vaudois), vagabonds, assemblers (a name given to a meeting or convention of Huguenots), fanatics, and children of God. They belonged to the romance-speaking people of Gothic descent, who took part in the earliest movements towards religious reform. It was in Languedoc that the peace of God and the mercy of God were formed in the 11th c. against the miseries of private war. There were long preserved the forms of municipal freedom, which nearly all Europe had lost; and there commerce flourished without spoiling the thrift, the patience, or the simplicity of the national character. Calvin was warmly welcomed when he preached at Nîmes, and Montpellier became the chief centre for the instruction of Huguenot youth; but it was in the triangular mountainous plateau called Cevennes, and there chiefly among the small farmers, the cloth and silk weavers, and the vine-dressers, that Protestantism was most universal and intense. The people were, and still are, very poor; but they are intelligent and pious, and add to the deep fervor of the Provençal character a gravity that is probably the result of the trials and sufferings of their ancestors.

To understand the position of the C. in the war which began at the commencement of the 18th c. it is necessary to glance at the preceding history of France. The system of toleration which was established by the edict of Nantes (q.v.), April 18, 1598, and the edict of Grace, July, 1629, was essentially a political compromise, and not a recognition of religious equality. The right of having a private chapel was given to certain seigneurs. New public churches were to be authorized at a certain rate in certain places. On the other hand, Calvinists were admitted to all public posts and to all professions; and they could publish books in towns where they had churches. The chamber of edict was formed in the parliament of Paris for the impartial judgment of cases brought by Huguenots; and the half-Catholic, half-Protestant constitution was adopted in the town consulates and the local parliaments of the south. After the short struggle between Louis XIII. and the duc de Rohan, the Huguenots settled down into contented industry; the army and navy of France were led by two Huguenots—Turenne and Duquesne—and Cardinal Bentivoglio wrote to the pope that he no longer found in France the insane fervor for right of conscience so radical among the Huguenots. But the court in which Mme. de Maintenon had succeeded to Mme. de Montespan, where Louvois, and the Jesuit, Père la Chaise, were as supreme as Bossuet and Flechier in the church, could not long be satisfied with tolerated heresy, which they chose to consider as veiled rebellion. On the death of Mazarin a commissioner had gone over the kingdom to inquire into the titles, or rather to suppress as many as possible, of the Huguenot churches, schools, and cemeteries. The extirpation of heresy had indeed been provided for by a clause in the marriage contract between Louis and Maria Theresa as long before as 1660, and in spite of the protection of Colbert, a policy was begun of gradually destroying the privileges of dissenters. They were shut out from public offices and trade corporations; they were forbidden to marry with Roman Catholics, and the conversion of their children seven years old and upward was encouraged and almost enforced. The famous edict came in Oct., 1685. It directed all dissenting churches to be destroyed, forbade their religious meetings under pain of imprisonment and confiscation of property, ordered all pastors who would not change their faith to be banished within fifteen days and to stop preaching at once, promised exemption from taxes and increased salaries to converted ministers, suppressed Huguenot schools and directed all children to be baptized and brought up in the Roman Catholic faith, prohibited all Huguenots except ministers from going abroad, and declared the property of those who had already gone to be forfeited unless they returned within four months. These were the main points of the edict revoking the liberal edict of Nantes. In carrying it out Huguenot Bibles and books of instruction were burned, and Huguenots were forbidden to hire themselves as artisans or as domestic servants. Torture, hangings, insults worse than death to women, the galleys, and imprisonment for life were the ordinary occurrences of the next sixty years. In the twenty years preceding the revocation, it is believed that 400,000 Protestants fled from France, and that 600,000 escaped in the twenty years that followed. But in the Cevennes the people were too poor to escape, and all over Languedoc began the secret meetings of the church of the desert. At last Louvois, the sanguinary war minister of Louis XIV., proposed that this district should be made an actual desert. An army of 40,000 was raised, and forts were erected at Nîmes, St. Hippolyte, Alais, and Anduze. The abbé du Challa, a Roman Catholic missionary from Siam, had been appointed inspector of missions in the Cevennes. He introduced the "squeeze" (an instrument of torture which resembled the Scotch "boot"), and his cruelty at last broke the patience of the victims. His assassination, July 28, 1702, was the first blow in the war. There was to have been a general massacre of



Roman Catholic priests, but the plan failed, and the originator, Esprit Seguer, soon fell. He was succeeded by La Porte, an old soldier, who, as his forces increased, assumed the title of "colonel of the children of God," and named his country the "camp of the eternal." His captains were selected from those on whom the prophetic influence had fallen, such as the forest-ranger, Castanet; the wool-carders, Conderc and Mazel; and the soldiers, Catinat, Joany, and Ravenel; but the most famous were Roland and Jean Cavalier, the baker's boy (see CAVALIER, JEAN). For three years the C. held out. Then there was sent against them an army of 60,000, among them an English brigade which had just returned from the persecution of the Vaudois. A policy of extermination was commenced, and in the upper Cevennes alone 466 villages were burned, and nearly the entire population put to the sword. In this bloody work the pope, Clement XI., assisted by issuing a bull against the "execrable race of the ancient Albigenses," promising remission of sins to the holy militia which was now formed among the Roman Catholic population under the name of cadets of the cross. The formidable force brought against them induced Cavalier to listen to proposals, and he finally assented to a surrender on being guaranteed liberty of conscience, the right of assembly outside of walled towns, the liberation of all his people then in durance, and the restitution to emigrants of their civil rights and property. Still, the greater part of the army, under Roland, Ravenel, and Joany, refused, and insisted upon the complete restoration of the edict of Nantes. They continued the war until the beginning of 1705, by which time their leaders were killed or dispersed and they became disorganized. In 1711 all outward signs of the reformed religion had disappeared, and Mar. 8, 1715, a few months before his death, Louis XIV., by a special medal and by proclamation announced the entire extinction of heresy. Fourteen years afterward, in spite of the strictest surveillance aided by military occupation, there had been organized in Languedoc 120 churches, which were attended by 200,000 Protestants. Persecution could not secure suppression, but it was not until 1775 that the last galley slave from Languedoc was liberated, and not till 1789 that the national assembly repealed all the penal laws against Protestantism.

There was a singular psychologic or spiritual phase in the history of the C. that must be noticed. It was a sort of inspiration or ecstasy. The subject, who had endured long fasting, became pale, and fell insensible to the ground. Then came violent agitations of the limbs and the head; and finally the patient, who might be a little child, a woman, or a half-witted person, began to speak in good French of the Huguenot Bible, warning the people to repentance, prophesying the immediate coming of the Lord in judgment, and claiming that these exhortations came directly from the Holy Ghost. After a long discourse the patient returned to his native patois with no recollection of what he had been doing or saying. All kinds of miracles, so they believed, attended upon the Camisards. Strange lights guided them to places of safety, unknown voices spoke encouragement, and wounds were often harmless. Those who were in the ecstasy of trance fell from trees without sustaining hurt; they shed tears of blood, and they subsisted without food for nine days. The supernatural was a part of their life. Many judgments have been passed upon these phenomena. Flechier and Brueys, Roman Catholics, consider them the product of fasting and vanity, nourished by apocalyptic literature. Bertrand and Calmeil, physicians, speak of magnetism, hysteria, and epilepsy, and a prophetic mania based on belief in divine possession. Most Protestants are content with the epithet "ecstasy," while semi-radical Roman Catholics consider the whole business the work of the devil. See Mrs. Bray's *Revolt of the Protestants of the Cevennes* (1870). See CEVENNES, God's TRUCE.

**CAMLET** (from Arab. *chamal*, fine) is properly a fabric made from the hair of the Angora goat (q.v.). The camlets made in Britain are either wholly of wool, or of wool mixed with cotton or linen, and spun hard.

**CAMMERHOFF**, JOHN FREDERICK, 1721-51; b. in Germany, and one of the first Moravian bishops in America, where he arrived in 1748, as assistant to the bishop then presiding. He won the confidence of the Indians, with whom he was a great favorite. In 1750, he attended an important Iroquois council at Onondaga, N. Y., making a canoe journey of 18 days up the Susquehanna, and going thence on foot through the wilderness, an exertion which ruined his health.

**CAMOËNS**, LUIS DE, the epic poet of Portugal, was b. about 1524, at Lisbon, and studied the ancient classics at Coimbra. On his return to Lisbon, he fell in love with a lady of honor, Catharina d'Atayada. This affair was the beginning of all the poet's misfortunes. Having been banished by royal authority to Santarem, C. joined the expedition of John III. against Morocco, and lost his right eye in a naval engagement with the Moors in the strait of Gibraltar. On his return to Lisbon, his bravery as a soldier was no more honored than his genius as a poet. Disappointed in all his hopes, he determined to leave forever his native land, and sailed for India, 1553. Offended by certain abuses of the Portuguese authorities in India, C. ventured to expose them in a satire, entitled *Disparates na India*, "Follies in India," in which he treated even the viceroy with ridicule. For this offense the poet was banished, 1556, to Macao, where he lived several years, and was engaged in writing *Os Lusíadas*. Here C. held the unpoetical but probably lucrative post of administrator of the effects of deceased persons; and having

saved, as he thought, a competency for his future life, was recalled from his banishment, 1561. Unhappily, in returning to Goa, he suffered shipwreck, and lost all his property, excepting his epic poem. After other wanderings and misfortunes, C. took ship for Lisbon, where he arrived in 1569, with no other wealth but his epic. He dedicated *The Lusiad* to the young king, Sebastian, who was very gracious; but, nevertheless, all the real patronage bestowed on C. consisted of a very small pension (about £4), and permission to remain at the court of Lisbon. Even this small pittance was taken away after the death of Sebastian, and C. was left in such poverty, that a faithful Indian servant begged in the streets of Lisbon for the support of the great epic poet of Portugal. C.'s lyric poems, written during this time of destitution, contain many pathetic lamentations. He died obscurely in the hospital at Lisbon, 1579; and 16 years afterwards, when it was proposed to erect a splendid monument to his memory, there was some difficulty in finding his burial-place.

*The Lusiad* (*Os Lusíadas*, "the Lusitanians") celebrates the chief events in the history of Portugal, and is remarkable as the only modern epic poem which is pervaded by anything like the true national and popular spirit of ancient epic poems. It is a gallery of epic pictures, in which all the great achievements of Portuguese heroism are represented. Among the most famous passages are the tragical story of Inez de Castro, and the apparition of the giant Adamastor, who appears as the Spirit of the Storm to Vasco da Gama, when crossing the cape. The versification of *The Lusiad* is extremely charming. Patriotic sentiments pervade the whole work. Besides his epic poem, C. wrote sonnets, odes, elegies, eclogues, epigrams, satires, epistles, and three comedies—*Os Amphitryões* (after Plautus), *King Seleucus*, and *Philodemo*. The latest and best complete edition of his poems appeared in three volumes (Hamburg, 1834). The best edition of *The Lusiad* was published in Paris (1817), reprinted in 1819, and again, with emendations by Berdier, in 1823. *The Lusiad* has been translated into Spanish, French, Italian, English, Polish, and German. See Burton, *Camões; his Life and his Lusiad* (1882); and a life by Storck (1890).

**CAMOGGI**, a t. of n. Italy, on the gulf of Genoa, about 13 m. e.s.e. of the city of that name. Its inhabitants, amounting to about 9000, are chiefly engaged in fishing.

**CAM'OMILE**. See CHAMOMILE.

**CAMOR'RA**, the name of a secret society, existing throughout all parts of the former kingdom of Naples, the members of which are called *camorristi*, and have exercised lawless force to a great extent over the humbler classes of society. Under the Bourbons, they openly presented themselves at markets, hackney-coach stations, public spectacles, and all occasions of popular amusement; assumed the right of deciding disputes; extorted a portion of whatever money passed from hand to hand for purchases, rents, wages, and the like, or in games; undertook also the transport of smuggled goods, and contracted for the commission of serious crimes. Their readiness for violence and murder, and their close association among themselves, made them so much dreaded, that even camorristi who had been thrown into prison, succeeded in exacting money from their fellow-prisoners, and from the jailer himself. The society has a central rendezvous in every large provincial town, and twelve such in the city of Naples. Those who belong to each of these sections of the society are under the absolute government of a chief elected by themselves, with whom is associated a treasurer. The latter has the charge of the common fund into which all the camorristi of that section pay their whole gains, for equal distribution among all their associates. Candidates for membership must show that they have neither been guilty of espionage nor theft; also, that neither their wives nor their sisters are prostitutes; and must swear upon an iron crucifix a fearful oath of fidelity and secrecy. The candidate remains for a year, with the designation of *picciotto d'onore*, as a pupil under an old camorrista; and having completed this probation, and given proof of his courage and obedience in circumstances involving danger of life, he is advanced to the rank of a *picciotto di aggarro*. Finally, after a longer period, and when he has given proof of his fitness on a number of occasions, he is admitted to full membership of the society as a *camorrista*. Each camorrista carries about with him two knives of peculiar form, by which the members of the society recognize each other. They are held under the strictest discipline. Disobedience is punished by flogging, suspension from employment, or expulsion; treachery, even on the part of a member who has been expelled, is punished with death. If two camorristi quarrel, their chief decides the question between them; but in difficult cases, a duel with daggers is the mode of decision. Under king Ferdinand II. the C. was tolerated for political reasons. The government of Francis II. endeavored to put down the society, and the police received instructions to seize and transport all known members of it. Those who remained entered into alliance with the Garibaldi committee, and rendered essential service in the expulsion of the Bourbons. An attempt was now made to employ them in the police service, but completely failed. The C. having fallen out with the new government, the members of the society now chiefly live by robbery in s. Italy.—See **MAFFIA**, **CARBONARI**.

**CAM'OFLET**, in military pyrotechny, is a stinking composition inclosed in paper-cases. It is used in siege-works, to blow into the faces of the sappers and miners, when hostile parties come within reach of each other, and thus to confuse them.

**CAMP** (Fr., from Lat. *campus*, a plain, or level field). The signification of this word in English is rather that which belonged to the Latin *castrum*, an encampment, or *castra*, a collection of tents, huts, and other structures, for the accommodation and protection of troops, than that which its etymology would more directly indicate. The regular system of encampment ultimately adopted by the Romans, was forced upon them by degrees. The most complete account of it is furnished to us by Polybius. A plan will be found in Dr. Smith's *Dictionary of Greek and Roman Antiquities*, constructed for the purpose of illustrating his description. When a Roman army was about to encamp, a tribune and several centurions were sent on before, to select a suitable site for the purpose. As soon as the locality was determined on, they chose the spot for the prætorium or general's tent, and marked it with a white flag. Around the prætorium, as a sort of center or heart to the whole system, the rest of the C. was laid out. It was generally placed on an elevated position, in order that the general might have the rest of the encampment under his eye, and be able to transmit his orders with greater facility. Polybius himself tells us, that the best conception which can be formed of a Roman C. of the more permanent kind is by regarding it as a military town, resembling in many respects no doubt that which has recently grown up at Aldershot (q.v.). The streets were broader than those usually to be found in towns, the wider ones measuring 100, and the narrower 50 ft.; and the *forum*, as its name indicates, was a sort of public market-place. A space of 200 ft. was left vacant all round between the tents and the ramparts, partly to afford space for the arrangements of the army, and for stowing away any booty that might be captured, but chiefly to protect the soldiers' huts from incendiary attempts from without. In form, the Roman C. was square, except in the case in which it was intended to embrace within its ramparts four legions, or two consular armies, when it became an oblong rectangle. The C. was surrounded by a fosse or trench (*fossa*), which was generally 9 ft. deep and 12 broad. On the top of the rampart, which was of earth, there were stakes. The labor of constructing the rampart and the fosse was divided between the allies and the Roman legions, the former making the sides along which they were stationed, and the legions the rest. The task of superintending the construction of the C. amongst the Romans was intrusted to the tribunes; amongst the allies, to the prefects. Before the arrival of the troops, the different parts of the C. were so distinctly marked out and measured off, that they at once proceeded to their respective stations, as if they had entered a well-known city, and were marching to their quarters. The discipline of the C. was of the strictest kind. The tribunes administered an oath against theft both to freemen and slaves, and two maniples were chosen to keep the *via principalis*, which was a place of general resort, clean and in good repair. The other occupations connected with the C., too numerous to be mentioned here, were portioned out in like manner; and the superintendence of the whole was intrusted to two tribunes chosen by lot from each legion, and appointed to serve for two months. The prefects of the allies possessed a similar authority, which, however, seems to have been limited to their own troops. Every morning at daybreak, the centurions and horsemen presented themselves to the tribunes, and these, in their turn, received their orders from the consul. The watchword for the night, marked on a four-cornered piece of wood, was given out with much formality. The night was divided into four watches, each of three hours' length; and there was a curious arrangement for ascertaining that guard was kept with vigilance. The soldiers of the watch companies received from the tribune a number of small tablets, with certain marks upon them, and these tablets were collected during the night by the horsemen whose duty it was to visit the posts, from such of the guards as they found on duty. Where these inspectors found the guards asleep or absent, they called upon the bystanders to witness the fact, and then passed on to the next. In the morning, the inspectors appeared before the tribunes, and gave up the tablets they had received, when the guards whose tablets were not produced were required to account for them. A regular scale of rewards and punishments was established in the camp. In comparing the encampments of the Romans with those of his own countrymen, Polybius tells us that the Greeks trusted mainly to a judicious selection of their ground, and regarded the natural advantages which they thus secured as supplying in a great measure the place of artificial means of defense. The Greeks, consequently, had no regular form of C., and no fixed places were assigned to the different divisions of the army. When the practice of drawing up the army according to cohorts, introduced by Marius and Cæsar, was adopted, the internal arrangements of the C. experienced a corresponding change. Laterly, even the square form was abandoned, and the C. was made to suit the nature of the ground. It was always held to be of importance, however, that the C. occupied a defensible position; that it could not be overlooked; and that it had a command of water.

When stationary camps (*castra stativa*) came into more general use, we hear of several parts which are not mentioned by Polybius, for example, the infirmary (*veterinarium*), the farriery (*veterinarium*), the forge (*fabrica*), etc.; and as a great variety of troops then came to be employed, they must, of course, have had new stations appointed to them in the camp. Many of the stationary camps ultimately became towns, and to this is ascribed the origin of most of the towns in England the names of which end in *cester* or *cheater*. Amongst the most perfect of those which retained the form of the simple

encampment, is that at Ardoch in Strathearn, Perthshire, in the grass-covered mounds and ridges of which most of the divisions of the C. have been distinctly traced by antiquaries.

It is believed that, during the middle ages, the plan adopted by the Romans in their camps was more or less adhered to, seeing that the weapons employed, which mainly determined the character of the troops, were nearly the same. In Britain, before the arrival of the Romans, and also during the Saxon and Danish periods, the camps, usually circular in form, appear to have been somewhat rude in character, with the cavalry grouped round the standard in the center, and the infantry placed near the front.

The principles of castrametation, or camp-formation, underwent much change after the invention of gunpowder, owing to the necessity for defending the C. from artillery. Permanent camps are in use by several modern armies, as at Aldershot (q.v.) and at Châlons-sur-Marne.

**CAMP**, a co. in n.e. Texas; formed 1874; drained on w. by Big Cypress Bayou; surface well covered with oaks and pines; soil productive. Area, 200 sq.m. Pop. '90, 6624, inclu. colored. Co. seat, Pittsburg.

**CAMPAGNA**, a t. of Italy, in the province of Salerno, is situated between high mountains, about 20 m. e. of Salerno. It has a fine cathedral, several convents, and a large annual fair. Pop. about 9000.

**CAMPAGNA DI ROMA**, an undulating, uncultivated, and unhealthy plain of Italy surrounding Rome, including the greatest part of ancient *Latium*, and forming the late papal delegation of Frosinone and a great part of the *Comarca di Roma*. Its length is variously stated, arising from the fact that different authorities measure it from different points. But supposing the name to apply to the district extending from cape Lınaro, s. of Civita Vecchia, to Terracina, beyond the Pontine marshes, its length is about 90 m.; and its breadth inland, to the Alban and Sabine hills, is stated at from 27 to 40 miles. A broad strip of sandy plain skirts the Mediterranean. The ground, which never rises above 200 ft. above the sea, is almost entirely volcanic, and the lakes are formed by craters of extinct volcanoes. The vapors rising from this district, and especially from the Solfatara (q.v.), produce the pestilential atmosphere styled *aria cattiva*. The number of inhabitants is very small, and in summer they are driven from the C. by its pestilential air, and seek shelter in Rome and other neighboring places. In autumn, herdsmen descend from the Apennines to the C. with their herds, the pasturage in some parts being rich and abundant. This district was not always uncultivated and depopulated as we now find it, for Domitian and Hadrian built here their splendid villas. Wars and devastations, the "black-death" (q.v.) in the 14th c., which greatly thinned the population, and inundations from the Tiber, have been the main causes of the present state of the C.; but, according to Livy, it was always an unhealthy district, even when well cultivated. Some of the popes, especially Pius VI., have endeavored to drain the Pontine marshes, and, during the dominion of the French in Italy, gen. Miollis made great improvements in drainage, timber-planting, and cultivation in the Campagna. Since '68, the government has done much to reclaim the C. See Lanciani's *Ancient Rome in the light of Recent Excavation* (1888).

**CAMPAIGN** generally means a connected series of military operations, forming a distinct stage or step in a war. Under the old system of warfare, when armies kept the field only during the summer months, a C. was understood to include all that was done by an army from the time it took the field till it went again into winter-quarters. Now that winter is no longer allowed to arrest military operations, it is more difficult to say where one C. ends and another begins. Some writers make a C. include all the steps taken to accomplish some one immediate object.

**CAMPAN**, a t. in France, in the department of Hautes-Pyrénées, 18 m. s.e. of Tarbes; pop. about 2000. It is in a valley of the same name, on the Adour, and is noted for picturesque scenery, for a stalactite grotto, and marble quarries, along the road to Bagnères de Bigorre. Some of the finest of colored marbles, with green, flesh-colored, red, and white veins, are found here.

**CAMPAN**, JEANNE LOUISE HENRIETTE, reader to the daughters of Louis XV., was b. in Paris, Oct. 6, 1752. She was favored by Marie Antoinette, and gave her royal patroness numerous proofs of her fidelity. When the unfortunate queen was conveyed to the Temple, she wished to share her captivity, but was refused entrance by Petion. During the reign of terror, she remained concealed at Combertin. After the fall of Robespierre, she opened a boarding-school at St. Germain-en-Laye, which was patronized by Josephine Beauharnais, who sent her daughter Hortense to it. In 1806, Napoleon appointed her lady-superintendent of the institution at Ecouen for the education of the daughters of the officers of the legion of honor. After the restoration, this institution was suppressed, and Mme C. retired to Mantes, where she died, May 16, 1822. She is chiefly remembered on account of her interesting works—*Mémoires sur la Vie Privée de la Reine Marie Antoinette* (4 vols., 5th ed., Par. 1824); *Journal Anecdotique* (Par. 1824); and *Correspondance Inédite avec la Reine Hortense* (2 vols., Par. 1835)—giving recollections of the court of Louis XV., of Marie Antoinette, the revolution, and some traits from the private character of Napoleon.

**CAMPANA, LA**, a t. of Andalusia, Spain, situated on the Madre-Vieja, a tributary of the Guadalquivir, about 37 m. e.n.e. of Seville. The inhabitants, numbering about 5000, are engaged chiefly in agricultural pursuits, and in weaving and brick-making.

**CAMPANA-RIO**, a t. of Estremadura, Spain, about 62 m. e.s.e. of Badajoz. It is an ill-built place, with narrow, uncared-for streets. It has manufactures of linens and ropes, and a trade in the agricultural produce of the neighborhood. Pop. 7000.

**CAMPANELLA**, TOMMASO, a Dominican monk celebrated for his philosophical ability. was b. in 1568 at Stilo in Calabria, and studied in Naples and Cosenza. The writings of Telesius first awakened his doubts respecting that pile of artificial dogmas styled the "scholastic philosophy." The results of his studies were given in his *Philosophia Sensibus Demonstrata*, etc. (Naples, 1591), which contained a defense of Telesius. His superiority in disputations exposed him to the hatred and false accusations of the orthodox monks and schoolmen. He was in consequence compelled to flee from Naples to Rome, and thence to Florence, Venice, and Bologna. Afterwards, he returned to Calabria, but having involved himself in a political conspiracy, he was seized and confined in a Neapolitan dungeon for 27 years; tried five times, and tortured seven; accused of heresy; and declared the author of a book which had been published thirty years before he was born. In 1626, pope Urban VIII. had him brought to the prison of the inquisition at Rome, but immediately liberated him, and treated him in a very generous manner. After being again persecuted by the Spanish government, C., who had formed the friendship of the French ambassador at Rome, the duc de Noailles, obtained a letter of introduction to cardinal Richelieu, and secretly left for France, where he was graciously received. He died in the Dominican monastery of St. Honoré, near Paris, 1639. Most of his works—*De Gentilismo non Retinendo* (Paris, 1636); *Astrologicorum Libri VII.* (Lyons, 1629); *Prodromus Philosophiæ Instaurandæ* (Frankfort, 1617); *Exordium Metaphysica Nova, De Sensu Rerum et Magia* (Frankfort, 1620)—were written during his imprisonment. His philosophical views give expression to that confused fermentation of new ideas which was characteristic of the close of the 16th and opening of the 17th c.—bold and clear opinions strangely mingled with commonplaces and with astrological dreams and fancies. It may seem strange that C. should have been patronized by the pope; but this favor was gained, not by his speculative works, but by several writings in defense of the Roman Catholic church. His *De Monarchia Hispanica Discursus* is a work of great power and value, comprising a sketch of the political world of C.'s time, with special reference to Spain. It was translated into English during Cromwell's protectorate. See *Life* by Baldacchini (1840), and by Amable (1883).

**CAMPANHA**, a t. of Brazil, about 150 m. n. w. of Rio de Janeiro, surrounded by bare hills, much cut up by gold-mines. The houses are built chiefly of earth, and surrounded by gardens. C. has several churches, a Latin school, a hospital, theater, etc. Pop. 6,600.

**CAMPANIA**, anciently a province of central Italy, having Capua as its capital (now subdivided into the provinces of Benevento, Naples, Salerno, Avellino, and Caserta), was bounded on the s. by Lucania, e. by Samnium, n. by Latium, and w. by the Tyrrhenian sea. It was one of the most productive plains in the world, producing in extraordinary abundance corn, wine, and oil; and both by Greek and Roman writers is celebrated for its soft and genial climate, its landscapes, and its harbors. It was the *regio felix* of the Romans, who built here many of their most splendid villas, etc. Through it passed the Appian Way, the greatest high-road of Italy. The promontory Misenum, Mt. Vesuvius, the river Volturnus, the towns Baiæ, Cumæ, Linternum, Puteoli, Naples, Herculaneum, Pompeii, Nola, Salernum, Capua, etc., belonged to Campania. It was the oldest Greek settlement in Italy, having been colonized, according to the later chronologers, about 1050 B.C.; but this is in all probability too early a date. It was next conquered by the Etruscans, and several of the towns above mentioned, such as Capua and Nola, were founded by that people. The Etruscans then succumbed to the more warlike and hardy Samnites, who, in their turn, yielded to the irresistible valor of Rome (340 B.C.). Through all these vicissitudes of conquest, the substratum of the people remained as at the beginning. The mass of the Campanians were essentially of Oscan race, and Oscan they remained. Indeed, it is mainly from them that our knowledge of the Oscan language is derived, and one of their towns—Atella, between Capua and Naples—had the honor of introducing upon the early Roman stage a species of popular drama or comedy, which was greatly relished for its quaint and vigorous humor. See **ATELLANÆ**.

**CAMPANI-ALIMENTIS**, MATTEO, an Italian philosopher and mechanic of the 17th century. He was a curate in Rome, but devoted his time mainly to scientific pursuits, constructing the object-glasses with which two of Saturn's satellites were discovered; making illuminated and noiseless clocks; and attempting to correct the variations of the pendulum due to temperature. He published a work on horology. Giuseppe, a younger brother, was also an optician and astronomer of some eminence.

**CAMPANILE** (Ital., from Mid. Lat. *campana*, a bell), a name adopted from the Italian to signify a bell-tower of the larger kind, and usually applied only to such as are

detached from the church. Scarcely any of the existing bell-towers of England answer to the Italian conception of the C., but it is said that there was a very fine one at Salisbury, 200 ft. in height, which was destroyed by Wyatt. In Italy, they are found everywhere—at Bologna, Padua, Ravenna, Cremona, Venice. Perhaps the most remarkable are the so-called "leaning tower" of Pisa, and the C. of Florence. The former, which is circular in form, is decorated with columns and arcades to the summit of its eight stories, and presents a very imposing appearance, reminding the traveler of the Coliseum at Rome, from which, and the now destroyed Septizonium, the idea of it is said to have been taken by the architects Bonano of Pisa, and Wilhelm of Innsbruck. But though less curious, the famous C. of Giotto is perhaps even more worthy of the traveler's attention. It was erected in 1384, with the express object of surpassing, both in height and in richness of workmanship, any of the remains of antiquity. In form, it is a parallelopiped, and is of the same dimensions from bottom to top. Though it is very lofty—267 ft.—it consists of only four stories, of which the tallest are the uppermost and undermost; and the windows in the upper story are rather larger than those in the two beneath, the object being to counteract the diminution to the eye occasioned by the greater distance. The effect of this arrangement has been much praised by architects; but there seems ground for skepticism as to its advantages. The style is the real Italian Gothic, which unites simplicity with great richness of ornamentation. The original design of Giotto was that a spire of 100 braccia in height should have surmounted the present structure, and on the summit may be seen the four great piers from which it was intended that it should have risen. The splendid C. of Florence, in its present condition, must thus be regarded only as a fragment. There is a fine C. at Seville, 350 ft. in height, which was built by Guever the Moor in 1568. It is called La Giralda, from a brazen figure, which, though it weighs a ton and a half, turns with the wind.

**CAMPANI NI**, ITALO, b. Parma, 1846; an Italian tenor. He enlisted in the army of Garibaldi when fourteen years of age, and took part in the fight before Milazzo. Having discovered during the campaign that he had a wonderful voice, he studied singing for two years at the conservatory of Parma, and made his first appearance as the notary in *La Sonnambula* at one of the theaters of his native town. He sang with very little success with different opera companies till 1869. In that year he went to Milan and placed himself under the tuition of the celebrated teacher, Francesco Lamperti. After a thorough training he made his debut in *Faust* at La Scala of Milan, and was pronounced by a critical audience to be one of the finest tenors of the age. In 1872, he made his London debut as "Genaro," in *Lucresia Borgia*, and in 1878 sang with Christine Nilsson in New York. He returned to America during the season of 1879-80. Besides his great successes he was remarkable for the immense scope of his repertory, which included nearly 80 operas, the tenor rôles of which he sang at short notice. He d. in 1896.

**CAMPANULA** (Lat., a little bell), a genus of plants of the natural order *campanulaceæ* (q. v.), distinguished by a bell-shaped corolla with five broad short segments, filaments dilated at the base, a 2 to 5 cleft stigma, and a top-shaped capsule with 2 to 5 cells, opening by lateral clefts below the calyx segments. The species are very numerous, chiefly but not exclusively abounding in the northern parts of the world, and the more elevated districts of the temperate zones. They are mostly herbaceous, some of them annual. The name **BELL-FLOWER** is common to many of them, and is often extended to all. The flowers are in general beautiful, and many of the species are therefore frequent ornaments of flower-borders. Of the native American species, the most common, and one of the most beautiful, is the harebell (q. v.), or **BLUEBELL** (*C. rotundifolia*). The **CANTERBURY BELL** (*C. medium*) is a very beautiful annual, which has long been so generally sown in flower-borders in Britain, that it is almost as familiar to every one as the most common field-flowers. It is a native of the central parts of Europe.—Medicinal virtues were formerly ascribed to some species, particularly in affections of the throat, wherefore *C. trachelium*, frequent in woods in England, has received the name of throatwort; but they are now regarded as inert.—The roots of some are reckoned among esculents, as those of the rampion (q. v.) (*C. rapunculus*).

**CAMPANULA CEE**, a natural order of exogenous plants, herbaceous or half shrubby, with a bitter milky juice; leaves without stipules, and generally alternate; the calyx usually 5-lobed, its tube adhering to the ovary; the corolla monopetalous, inserted into the top of the calyx, usually 5-lobed and regular; the stamens inserted into the calyx, and alternate with the lobes of the corolla; the fruit with two or more many-seeded cells, crowned with the withered calyx and corolla, and opening by division of the cells (*loculicidally*); the seeds fixed to the axis, and having fleshy albumen. About 500 species are known, natives chiefly of the temperate and colder climates of the northern hemisphere, where their blue or white flowers are among the finest ornaments of fields and woods. The roots and young leaves of some species are eatable, as is the half-fleshy fruit of *canarina campanula*, a native of the Canary islands.

**CAMPASPE**, a river of Australia which flows north through Dalhousie county and joins the Murray at Echuca. The plains along its lower course support an agricultural population. Length, about 120 m.

**CAMPBELL**, a co. in n. w. Georgia, on the Chattahoochee river and the Atlanta and Westpoint railroad; 230 sq. m.; pop. '90, 9115, includ. colored. Among its minerals are gold and iron. Productions, corn, wheat, and cotton. Co. seat, Fairburn.

**CAMPBELL**, a co. in n. Kentucky, on the Ohio and Licking rivers; 140 sq. m.; pop. '90, 44,208, with colored. The surface is level in the bottom lands, and undulating away from the rivers; soil generally fertile, producing grain, tobacco, etc. Co. seat, Alexandria.

**CAMPBELL**, a co. in n.e. Tennessee, on the Kentucky border; watered by Clinch river; 488 sq. m.; pop. '90, 13,486, with colored. It has a rough surface, and is traversed by a spur of the Cumberland mountains, and is to a large extent covered with forests. It produces corn, wheat, and sugar. Co. seat, Jackboro.

**CAMPBELL**, a co. in S. Dakota; formed 1878. Area, 900 sq. m. Pop. 1890, 8510. Co. seat, Mound City.

**CAMPBELL**, a co. in s. Virginia, between James and Staunton rivers, intersected by the Norfolk and Western railroad; 465 sq. m.; pop. '90, 41,087, includ. colored. It has an uneven surface, and fertile soil; producing tobacco, corn, wheat, etc. Co. seat, Rustburg.

**CAMPBELL**, the family name of the lords of Argyle. See ARGYLE.

**CAMPBELL, ALEXANDER**, D.D., 1788-1866; b. in Ireland; educated at Glasgow university, and came to the United States in 1809, settling in Bethany, Va., as pastor of a Presbyterian church, from which he soon departed and organized a society whose doctrine was that the Bible should be the sole creed of the church. His followers increased, and are now known as "Disciples of Christ," or "Campbellites," and numbered (1896) 1,003,672. Dr. C. was the author of many works on religious subjects, and held important controversies with such disputants as Robert Owen, Archbishop Purcell, Rev. N. L. Rice, and Rev. Wm. McCalla. See DISCIPLES OF CHRIST.

**CAMPBELL, ALLAN**, born N. Y., 1815; a civil engineer who was prominent in the construction of the Harlem railroad, the Pacific railroad, and that from Callao to Lima, Peru, and was president of the Harlem railroad until succeeded by "Commodore" Vanderbilt. He was appointed commissioner of public works (N. Y.), 1876, and during 1883 was controller of the same city. In 1882 he was defeated as nominee of the Republicans and Independents for the office of mayor. He d. in 1894.

**CAMPBELL, ARCHIBALD**. See ARGYLE, DUKE OF.

**CAMPBELL, BARTLEY**, b. Allegheny City, Penn., 1848; began as a journalist; founded the *Evening Mail* in Pittsburg; started a monthly magazine in New Orleans; but the success of his first play, *Through Fire*, 1871, induced him to devote himself to dramatic authorship. He afterwards produced *Plato*, *Peril*, *The Virginians*, *My Partner*, *The Galley Slave*, *The White Slave*, etc. He d. 1888.

**CAMPBELL, Sir COLIN**, Lord CLYDE, one of the bravest soldiers and most distinguished generals of modern times, was born in Glasgow, in 1792. His father was a cabinet-maker, named John MacIver, but Colin assumed the name of Campbell, to gratify an uncle on the mother's side. He entered the army as an ensign in 1808; fought through the war in the Spanish peninsula with distinction, and took part in the expedition to the United States in 1814. In 1842, he attained the rank of col., and in the same year he was present at the attack on Chusan, in China, and for his services there received honorable mention in the *Gazette*. He next served in the Punjab, commanding the left at the battle of Chillianwallah. For his conduct in this battle, Lord Gough awarded him the highest praise in his dispatch to the governor-general of India. He next commanded in the Peshawur district, with uniform success against the hill-tribes. On the breaking out of the Crimean war in 1854, he was appointed to the command of the Highland brigade, and took a prominent part at the battle of the Alma; and afterwards at Balaklava, where, with the 98d Highlanders, which he did not even form into square, he beat back the Russian cavalry, who were swooping down on the port, with its accumulation of shipping and stores. His services in this war were rewarded with promotion to the rank of maj.-gen., and he was also created a knight grand cross of the order of the bath, and received the cross of the French legion of honor. He was appointed inspector-gen. of infantry, and in 1857, commander of the forces in India, then engaged in quelling the Indian mutiny, which by his energy and judgment was soon utterly subdued. One of the most notable characteristics of C.'s generalship, was the care he took of the lives of his men, all his victories being won with the minimum expenditure of the blood of his soldiers. For his exploits in India, C., in 1858, was created a peer of the realm, with the title of baron Clyde, and appointed a gen., the East India company granting him an annuity of £2000. C. arrived in Britain from India in 1860, and died Aug. 14, 1863. See *Life* by Gen. Shadwell (1881).

**CAMPBELL, JAMES EDWIN**, was born July 7th, 1848, at Middletown, O.: educated in the public schools; studied law; and in 1863 enlisted as gunner in the navy, serving with the Red River and Mississippi flotillas. In 1873 he was prosecuting attorney of Butler co.; was thrice elected to congress as a democrat (1882, 1884, 1886), and in 1889 Governor of Ohio, defeating Joseph B. Foraker. In 1891 he was defeated by William McKinley, Jr., and in 1895 by Asa S. Bushnell, on renomination.

**CAMPBELL, JOHN** (CAMPBELL), Lord, high chancellor of England, son of a minister of Cupar, in the co. of Fife, Scotland, was born in 1779. He was at first destined to follow his father's profession, and was sent, while still a mere boy, to the neighboring univer-

sity of St. Andrews. C. himself had no inclination for a clerical life, and when he had completed his studies in the faculty of arts, he left for London, being then about 19 years of age. He obtained employment on the staff of the *Morning Chronicle*, where, in due time, he was intrusted with the care of the theatrical criticism and the reports in the house of commons. He was called to the bar in 1806. His sound sense, and unpretending activity and devotion to business, were awarded with an extensive common-law practice, and, after a time, with professional promotion. The silk-gown of a king's counsel was conferred upon him in 1827. Three years afterwards, he entered parliament, actuated, he tells us in the preface to one of his works, by a desire to obtain for England the benefits of a national registry of titles to land. The effort, at the time, was unavailing, as the landlords, whom it was destined more immediately to benefit, completely misunderstood the purport of the project. C. was promoted by the Whig party, to which he had attached himself, to the solicitor-generalship in 1832, and to the attorney-generalship in 1834. In the same year, he was chosen the representative in parliament for Edinburgh. He continued to represent Edinburgh down to 1841, and remained in the office of attorney-general during that period, with the exception of the short time in 1835, when the conservatives were in power. In 1841, he was made chancellor of Ireland and a peer of the United Kingdom; but held the office of chancellor for only a few months, when the Melbourne cabinet left office, necessitating C. also to resign. For the first time since boyhood, he found himself without regular daily labor, and at the mature age of 60, set to work to win the literary fame which he professes always to have secretly coveted. His first publication was a collection of his speeches at the bar and in the house of commons. For three or four years after the publication of his speeches, C. was engaged in the preparation of the *Lives of the Chancellors*, the first series of which appeared in 1845. In 1846, he joined the Russell cabinet in the capacity of chancellor of the duchy of Lancaster. His ministerial duties were not sufficiently arduous to interrupt his literary labors, and he proceeded to complete the *Lives of the Chancellors*, and to publish a supplemental series of *Lives of the Chief-justices of England*. Both works have enjoyed great popularity, but leave no doubt that the author was more fitted for a practical lawyer than for a man of letters. C. returned to more congenial labors in 1850; he was then appointed to succeed Denman as chief-justice. He held the office for nine years, at the end of which he received the chancellorship of England. He d. June, 1861. His *Life* has been written by his daughter (1881).

CAMPBELL, THOMAS, a distinguished English poet, was b. in the city of Glasgow, 27th July, 1777. His father was a merchant, and the poet was the youngest of ten children. He was sent to the university of his native city, and remained there six years. During his collegiate course, he received several prizes, and was particularly distinguished for his knowledge of Greek literature. On leaving the university, C. went to reside as a tutor for a year in the island of Mull. The scenery of the w. Highlands made a deep impression on his mind, and to his abode in these grand and desolate regions we are indebted for many of the touches of sublimity which occur in his verses. Returning from Argyllshire, C. meditated the study of law, and repaired to Edinburgh; but he could not shake off his recollections. In his eyes, the mists were folded on the hills of Morven, the roar of Corrievekin was in his ears, and instead of prosecuting the study of jurisprudence, he wrote *The Pleasures of Hope*. The poem was published in 1799, and went through four editions in a twelvemonth. After its publication, C. went to the continent; and on Dec. 8, 1800, witnessed from a Bavarian monastery the battle of Hohenlinden, fought between the French and Austrians. In 1801, he returned to England with *The Bells of Erin* and *Ye Mariners of England* in his portmanteau; and shortly after, took up his abode in Edinburgh, where *Locheil's Warning* was composed. In 1803, C. proceeded to London, and adopted literature as a profession. He contributed articles to *The Edinburgh Encyclopædia* and compiled *The Annals of Great Britain from the Accession of George II. to the Peace of Amiens*, in 3 vols. In 1806, through the influence of Mr. Fox, C. received a pension of £200 per annum from government. In 1809, he published *Gertrude of Wyoming*, which bears the same relation to *The Pleasures of Hope* that *The Castle of Indolence* bears to *The Seasons*—a less brilliant and striking, but more mature and finished performance. In 1818, C. was again in Germany, and on his return, he published his *Specimens of the British Poets*, in 7 vols. In 1820, he delivered a course of lectures on poetry at the Surrey institution. From this date to 1830, C. edited *The New Monthly Magazine*, and contributed thereto several poems, one of which, *The Last Man*, is in some respects the loftiest of all his performances. In 1824, he published *Theodorie and other Poems*. In 1827, he was elected lord rector of the university of Glasgow, and received the unusual honor of re-election the two following years. He published *The Pilgrim of Glencoe and other Poems* in 1842. His later publications did not add to his fame. He died at Boulogne, in 1844, and was buried in Westminster abbey, Macaulay, Dean Milman, and other celebrated persons bearing the ps.

C. is an established English classic. With the young, *The Pleasures of Hope* will ever be a chief favorite; while readers of maturer years will linger with delight over the sylvan scenery and tender domestic scenes of *Gertrude*. It is in his lyrics, however, that C. has ascended highest into the heavens of song—*Hohenlinden*; *Ye Mariners of England*; and *The Battle of the Baltic*, cannot be paralleled in the language. Than these lyrics,



nothing can be more simple and spirited. Once read, they cannot be forgotten. They will fan the patriotism of many generations.

**CAMPBELL, WILLIAM**, 1745-81; b. in Va.; an officer in the revolutionary war. He was among the earliest of the patriot troops from that colony, and was distinguished in the conflicts of King's Mountain and Guilford, for which he was promoted to be brig.-gen. He died in Lafayette's camp, just before the Yorktown surrender.

**CAMPBELL, WILLIAM**, Lord, d. 1778; the last English governor of South Carolina. He was a capt. in the navy; a member of parliament in 1764; in 1766, governor of Nova Scotia, and 1775, of South Carolina. He was active in stirring up the Indians against the colonists, and was in the expedition led by sir Peter Parker against South Carolina, in the course of which he received the wound that caused his death.

**CAMPBELL ISLAND**, a lonely spot on the s. Pacific, in lat. 52° 33' s., and long. 169° 9' e. Though it is mountainous, and measures only 36 m. round, it is yet valuable on account of its harbors. It is also scientifically interesting, being volcanic, and displaying a rich and rare flora.

**CAMPBELLITES**. See DISCIPLES OF CHRIST.

**CAMPBELTOWN**, a royal burgh and seaport, on the e. coast, near the s. end of the peninsula of Cantire, in Scotland, and the most important town in that co., is 65 m. w.s.w. of Glasgow, on a fine harbor or sea-loch, nearly 3 miles long, and 1 mile broad, and sheltered by Davarr Island. It unites with Ayr, Inverary, Irvine, and Oban to return one member to parliament. A sculptured granite cross stands in the principal street, and is supposed to have been brought from Iona. Pop. '91, 8235. There are many distilleries in the town and there is a coal mine in the vicinity. Its fisheries are important. C. is a favorite summer resort.

**CAMPPE**, JOACHIM HEINRICH, 1746-1818; a German teacher educated at Halle in theology, and chaplain at Potsdam. In 1787 he was counselor of education in Brunswick, where he published books for schools, and established a prosperous business. His works on education have been widely circulated, not only in German, but in other languages.

**CAMPPEACHY**, one of the states of Mexico occupying the s. part of the peninsula of Yucatan, and bordering on Guatemala and the Belize; 18,087 sq. m.; pop. 1865, 90,458, of whom a large proportion are Indians. The soil is for the most part sandy and unproductive, but there are good pasture lands. The main productions are rice, sugar, and salt.

**CAMPPEACHY**, a seaport on the w. side of the peninsula of Yucatan, which divides the Caribbean Sea from the Gulf of Mexico. It is in lat. 19° 50' n., and long. 90° 33' west. Though it has a shallow haven, yet it is the center of the trade in logwood; it exports likewise cotton and wax. It is a handsome city of 18,700 inhabitants, containing churches, convents, a cemetery, a theater, a college, and shipbuilding docks. *Campeche* is the Spanish spelling.

**CAMPEGGIO**, or **CAMPEGGI**, LORENZO, 1472-1539; in early life a lawyer, but on losing his wife he joined the Roman Catholic church and rapidly rose to the position of cardinal. In 1519, he was sent to England to preach a crusade against the Turks, but was unsuccessful. Henry VIII. made him bishop of Salisbury in 1524, and he came again to England in 1528 to assist Wolsey in the case of Henry's divorce from Catherine. He accomplished nothing, however, and the see of Salisbury was taken from him.

**CAMP EQUIPAGE** is a general name for all the tents, furniture, fittings, and utensils carried with an army, applicable to the domestic rather than the warlike wants of the soldier. In the days when armor was worn, the C. E. was enormously heavy and complicated. In the present day, a certain amount of C. E. is provided for a given number of troops. See **CAMP**; **TENT**.

**CAMPER**, PETER, one of the most learned and acute physicians and anatomists of the 18th c., was born at Leyden, 11th May, 1722, and studied medicine there. In 1750, he became professor of medicine at Franeker; in 1753, at Amsterdam; and in 1765, at Groningen. In 1773, he resigned his post, resided some time at Franeker, and then traveled. On being elected a member of the state council in 1787, he removed to the Hague, where he died, 7th April, 1789. C. was distinguished not only for the services he rendered to anatomy, surgery, obstetrics, and medical jurisprudence, but also as a promoter of the fine arts. He was remarkably skillful in pen-and-ink drawing, painted in oil, embossed, and even acquired considerable experience as a sculptor. For his observations on the facial angle, see article **ANGLE**. His work on the connection of anatomy with the art of drawing was an important contribution to the theory of art. Another work, *Description Anatomique d'un Eléphant Mâle*, edited by his son, G. A. Camper, and published at Paris in 1802, is also worthy of notice. C.'s collected writings, with plates, appeared under the title, *Œuvres qui ont pour Objet l'Histoire Naturelle, la Physiologie et l'Anatomie comparée*, 8 vols. (Par. 1803).

**CAMPERDOWN**, a broad tract of low downs which separates the small hamlet of Camp, in North Holland, from the German ocean, about 80 m. n. from Haarlem. It is

known on account of the victory obtained, off that part of the coast, by Admiral Duncan over the Dutch fleet, Oct. 11, 1797. The Dutch fleet, under Admiral Van Winter had stolen out of the Texel, with the view of joining the French fleet at Brest, when it was intercepted by Admiral Duncan, and after an obstinate battle, attended with great loss, on both sides, the Dutch admiral was compelled to yield, leaving 8 sail of the line and several smaller vessels in the hands of the English, himself becoming a prisoner.

**CAMP FOLLOWERS** are the sutlers and dealers in small-wares who follow an army. In India, owing to the peculiar habits and customs of the Hindus, and the large number of servants retained by English officers, the C. F. are in immense number: comprising servants, sutlers, cantiniers, hostlers, water-carriers, snake-charmers, dancers, conjurers, and women. In Feb., 1889, when a Bengal army of 15,000 men left Shikarpoor for Afghanistan, it was accompanied by no fewer than 85,000 C. F.; the commander took with him six weeks' food for the whole 100,000. All English commanders in India find this regulation a very burdensome one. Even in European armies, however, C. F. are regarded as necessary; they are under the control of the commanding officer, and are subject to the articles of war—not, however, in cantonments, only in the field. French armies are accompanied by women much more largely than English.

**CAMP HAUSEN, WILHELM**, b. 1818; a German painter whose specialty was battle pieces, to qualify for which he served as a volunteer in the army. Among his works are "Tilly at Breitenfeld," "Prince Eugene at Belgrade," "Godfrey de Bouillon at Ascalon," "Puritans watching the Enemy," "A Convoy of Prisoners of Cromwell's Camp," "Cavaliers and Roundheads," "Storming of an English Castle by Cromwell's Soldiers," "Charles II. in the Retreat from Worcester," "Charles I. at Naseby," etc. In 1859 he was made professor of historical painting in the Düsseldorf academy. He d. in 1885.

**CAMPHENE**, or **CAMPHELENE**, is an artificial variety of camphor obtained from turpentine, by acting thereon with the dry vapor of hydrochloric acid, and keeping the whole at a low temperature by immersing the vessel in a freezing mixture. A solid substance is produced, which separates in white crystalline prisms, and has the taste and agreeable aromatic smell of common natural camphor. As prepared, it is strictly a hydrochlorate of C.; but the latter can be obtained free from hydrochloric acid, by passing the vapor of the compound substance over dry heated quicklime, when the acid is held by the lime, and pure C. passes over. It is not so similar to ordinary camphor when thus freed from the hydrochloric acid.

**CAMPHENE** is the name applied to a variety of spirit of turpentine obtained from the *pinus australis* of the southern states of America, and rather extensively sold and used in Britain for burning in out-of-door lamps. It is very volatile, and burns very freely, giving off a pure white brilliant light; and when the vapor diffuses itself through air, and is set fire to, it forms a dangerous and violently explosive mixture.

**CAMPHEOR** is a solid essential oil which is found in many plants, and may be separated from many essential oils. It particularly abounds in certain species of the natural order *lauraceae* (q.v.). Almost all the C. of commerce is the produce of the C. laurel or C. tree (*camphora officinarum*, formerly known as *laurus camphora*), a native of China, Japan, Formosa, and Cochin-China, and which has been introduced into Java and the West Indies. The genus *camphora* differs from *cinnamomum* (see CINNAMON) chiefly in having a thin instead of a leathery calyx. The C. laurel is a tree of considerable height, much branched, with lanceolate, evergreen leaves on short stalks, and small yellowish-white flowers in axillary and terminal panicles. The fruit is in size and appearance not unlike an imperfectly ripened black currant. Every part of the tree, but especially the flower, smells strongly of camphor. The wood is light and durable, not liable to be injured by insects, and much valued for carpenter's work. In the extraction of C. from the *C. laurel*, the wood of the stem and branches is chopped up into fragments, and introduced into a still with water, and heat applied, when the steam generated carries off the C. in vapor. These vapors rise, and in passing through rice-straw, with which the head of the still is filled, the C. solidifies, and is deposited round the straw in minute grains or particles, somewhat about the size of raw sugar or coarse sand. These grains of impure C. are detached, and being introduced into a large globular glass vessel in quantities of about 10 lbs., are reheated, when first the water rises in steam, and is allowed to escape at a small aperture; and thereafter, this aperture being closed, the C. sublimes and resolidifies in the interior upper part of the flask, as a semi-transparent cake, leaving all the impurities behind. The flasks are then cooled and broken by throwing cold water on them, and the C. taken out, and sent into market. The glass globes employed are called by an Italian name, *bombolo*, the sublimation of C. having been first practiced in Venice.—C. was unknown to the Greeks and Romans, and was first brought to Europe by the Arabs. It is a white tough solid, slightly lighter than water, and floats thereon. It is very sparingly soluble in water, but freely soluble in alcohol, ether, acetic acid, and the essential oils. It fuses at 347°, and boils at 399°, and when set fire to, is very inflammable, and burns with a white smoky flame. Thrown upon water, it floats, and may be set fire to, when the currents generated alike from the solution in water and the irregular burning of the pieces, cause a curious rotatory motion. It has a peculiar hot aromatic taste, and an agreeable characteristic odor.

C. is used in medicine, both internally and externally, as a temporary stimulant. It is frequently employed in gout and rheumatism. In small doses, it acts as an anodyne and antispasmodic; in very large doses, it is an irritant poison. It is generally reckoned an anaphrodisiac. Its alcoholic solution and liniments in which it is the principal ingredient, are much used for external application in sprains and bruises, chilblains, chronic rheumatism, and paralysis.—The effluvia of C. are very noxious to insects, and it is therefore much used for preserving specimens in natural history.

The Borneo C. or Sumatra C. of commerce, sometimes called hard C., is the produce of *dryobalanops aromatica*, a large tree of the natural order *dipteraceæ* (q.v.). The C. is obtained by cutting down the tree, and splitting it into small pieces; being found in crystalline masses in natural cavities of the wood. To this substance, the Chinese ascribe extraordinary medicinal virtues, so that it is sold among them at more than 50 times the price of common camphor. It is seldom brought to Europe as an article of commerce.—The *dryobalanops aromatica* yields also a pale-yellowish limpid fluid, which gushes out when deep incisions are made in the tree with an axe, and which is generally called liquid C. or C. oil. It is sometimes imported into Europe. It has a smell somewhat resembling that of C., but more aromatic, like oil of cajeput. It is supposed to be from this fluid that the crystalline hard C. is deposited. See BORNEENE.

**CAMP'HYSEN**, DIRK RAFAELZ, 1586-1627; a Dutch painter, theologian, and poet. He made a translation of the Psalms, and wrote many short poems of merit; also several theological works, among which was a compendium of the doctrines of Socinus. His fame rests upon his work as a painter, which was more than ordinarily good.

**CAMPI**, a family of artists, who founded at Cremona, in the middle and near the close of the 16th c., an eclectic school of painting, parallel with that founded by the family Caracci (q.v.). Giulio C. (1500-72) was the head of the school. He studied painting, sculpture, and architecture under Giulio Romano. He also imitated the works of Titian (at least in coloring) and Pordenone with such success that his pictures have sometimes been ascribed to both of these artists. His female heads, like those of his brothers, are remarkably beautiful.—Antonio C. studied, under his brother, both painting and architecture. His knowledge of the latter was very serviceable in several of his paintings; for example, that of the sacristy of St. Peter. He was also a plastic artist, an engraver, and the historian of his native place.—Vincenzo C. (b. before 1532, d. 1591) seems to have followed the guidance of Antonio rather than that of Giulio, and excelled more in small figures than in large pictures. His paintings of fruits are highly valued.—Bernardino C. (b. 1522, d. about 1590), a kinsman of the three brothers C., was the most famous of the whole. Lanzi terms him "the Annibale Caracci" of the school. He studied first under Giulio C., but soon excelled his master. Afterwards, he chose Giulio Romano, Titian, and Correggio as models, but chiefly followed Raphael, yet without servile imitation. Many of his works are found in Milan and Cremona. In the latter place, the cupola of the choir in the church San-Gismondo is Bernardino's master-piece. He was distinguished as a portrait-painter and engraver. The lady-painter, Sophonisba Anguissola, was a distinguished pupil of Bernardino.

**CAMP'IAN**, OR **CAMPION**, EDMUND, 1540-81; one of the few English Jesuits of celebrity; educated at Oxford; ordained deacon in 1567, but as he could not consent to the Protestant formulary as required by the English church, he went to Ireland and wrote a history of that country; and then to Douay, where he joined the society of Jesus. In 1580, he returned to England as a propagandist missionary. The next year he was charged with exciting the people to rebellion and holding treasonable correspondence with foreign powers, found guilty, and hanged at Tyburn, with several others of his order.

**CAMPIDO'GLIO**, PALAZZO DEL, a famous palace erected by Michael Angelo on the Capitoline hill, in Rome. It stands on the site of the ancient capitol.

**CAMPINAS**, or SAN CARLOS, a t. of Brazil, in the province, and 70 m. n. of the city of Sao Paulo, is situated in a fertile and picturesque district, on a small river, the Piraticaba, a feeder of the Parana. There are large coffee and sugar plantations in the surrounding district, and large quantities of sugar are exported. Many of the houses are built of mud or clay, and the immense church, whose walls are 5 ft. thick, is composed of beaten earth. Pop. 18,000.

**CAMPION**. See LYCHNIS and SILENE.

**CAMP-MEETING**, a series of religious meetings held in the open air, usually in the woods, and participated in by families or groups of persons from a distance, who live in tents or in simply-built houses during the sessions and devote the greater part of the time to listening to preaching, which is always direct and fervent and is usually accompanied by a "revival." The first held in the United States was in 1799, at a settlement on Red river in Kentucky, and was the outcome of the preaching of Rev. John M'Gee, a Methodist, his brother, a Presbyterian, and Rev. Mr. Hoge, also a Presbyterian, at a communion service. Their exhortations affected their audience so strongly, that crowds came from the surrounding country to hear confes-

sions and "testimonies," and the meeting, transferred from the small meeting-house to the adjoining forest, was protracted for several days, and was followed by others in different places. The number of persons attending one camp-meeting in Kentucky was estimated at 20,000. At first, Presbyterians and Baptists united with the Methodists in holding these meetings; but they soon came to be confined to the last-named denomination, which in all its branches has been most enthusiastic in supporting them and in introducing them into all parts of the country, though even within the denomination they have met with opposition. In many states camp-meetings have lost some of the characteristics of early days; the places of meeting being fixed, and the life less simple. Not unfrequently secular instruction is a feature; schools of languages, music, art, etc., and lectures on various topics, filling the time not occupied by religious services. Among the many popular camp-meeting grounds of the Methodist Episcopal church are Sing Sing, N. Y., Ocean Grove, N. J., Martha's Vineyard, Mass., Lakeside, O., Bartley, Neb., and Pacific Grove, Monterey, Cal.

Lorenzo Dow (q.v.) introduced camp-meetings into England in 1807, but the Wesleyan Conference refused (as it still does) to sanction them, and to this attitude was partly due the organization of the Primitive Methodist denomination in 1810. See *An Essay on Methodism* (N. Y., 1849) and Porter's *Camp-Meetings*.

**CAMPORAS'SO**, a province in s. Italy, 1691 sq. m.; pop. est. '95, 882,181. The surface is almost wholly mountainous, the highest point being monte Miletto, 6,740 feet. Chief products, grain, wine, and vegetables. There are manufactories of steel and iron ware. The most important stream is the Biferno.

**CAMPORAS'SO**, a fortified t. of s. Italy, in the province of the same name, about 53 m. n.n.e. of the city of Naples. The town stands on a slope of the monte Verde, in a cool, airy, and healthy region. It has a fine cathedral, a ruined castle, some convents, and palaces belonging to resident nobles. It has manufactories of cutlery, which have a considerable reputation for excellence. Its situation, though far from inviting as regards scenery, is favorable for trade, which is facilitated by good roads. Pop. '94, 15,800.

**CAMPORAS'SO**, NICOLÒ, Count of, a soldier of fortune in the 15th c.; the son of a noble family whose estates were confiscated because he sided with Anjou in a war against Naples. He sold his services to Charles the Bold, but subsequently betrayed him, and was suspected of being concerned in Charles's death. Walter Scott depicted C. in *Anne of Geierstein*.

**CAMPOBELLO**, an island of New Brunswick, situated at the mouth of the Passamaquoddy Bay, in lat. 44° 57' n., and long. 66° 55' west. It is small, being 8 m. long, and from 1 to 3 m. broad; but it is decidedly valuable, possessing some good harbors, and, at its e. end, a light-house of 60 ft. in height. It contains copper and lead ores, but its inhabitants are chiefly engaged in the cod, herring and mackerel fisheries. It is a summer resort and has a fine hotel. Pop. 1200.

**CAMPO DE CRIPTAÑA**, a t. of Spain, in the province of, and about 50 m. n.e. of the city of Ciudad Real. It has manufactures of coarse cloths, and some trade in corn and fruits. Pop. 7200.

**CAMPO-FORMIO**, a village in the province of Udine, northern Italy, about 7 m. s.w. of the city of Udine, is celebrated for the treaty of peace here concluded, Oct. 17, 1797, between Austria and the French republic. After subjugating Italy (1796), the French army had crossed the Noric Alps, and threatened Vienna. Austria, therefore, hastened to arrange preliminaries of peace. In the treaty which was concluded by Bonaparte with the count of Coblenz, 17th Oct., 1797, Austria ceded the Netherlands, Milan, and Mantua, and received as compensation the districts Istria, Dalmatia, and the left bank of the Adige in the Venetian states, and the capital, Venice; while France took the remaining territory of Venice, its possessions in Albania, and the Ionian islands. In the secret articles of the treaty, Austria, in ceding the left bank of the Rhine, was to receive as compensation Salzburg and the Bavarian district on the Inn; and promises were held out to the duke of Modena, and other Italian houses, that their concessions should be compensated at the cost of Germany.

**CAMPOMANÉS**, PEDRO RODRIGUEZ, Count of, Spanish minister and director of the royal academy of history at Madrid, founded by Philip V. in 1738, was b. in Asturias in 1723. His talents and learning were devoted to the advancement of his native country. By his enlightened views of state policy, as well as by his writings, which ranked him among the most eminent Spanish authors, he obtained a great reputation throughout Europe. He gave effectual assistance to count Aranda in his difficult enterprise of driving the Jesuits out of Spain. He died Feb. 8, 1802. C.'s chief works are *Antigüedad Marítima de la Republica de Cartago con el Périplo de su general Hannón, traducido del Griego y ilustrado* (Madrid, 1756); *Discurso sobre el fomento de la Industria popular* (1771); *Discurso sobre la Educación popular de los Artisanos y su fomento* (1775); *Apéndice a la Educación popular* (1775-77). These writings contained his opinions on politics, taxation, agriculture, manufactures, and commerce. The best known of his financial productions is *Tratado de la Regalía de Amortización* (Madrid, 1766).

**CAMPOS, ARSENE MARTINEZ.** See MARTINEZ-CAMPOS.

**CAMPO SANTO**, (holy field) is now the Italian designation for a cemetery or burying-ground, but more especially for an inclosed place of interment, surrounded internally by an arcade, for the burial of persons of distinction. See CEMETERY.

**CAMPUS**, in ancient Rome, a vacant space in or near a city, for public shows, combats, etc. There were eight around Rome, of which the C. Martius (camp of Mars) was the most important. It was outside the walls, occupying the level space between the Quirinal, Pincian, and Capitoline hills. In this met the *comitia centuriata* and the *comitia tributa*; and in it was the public hall for the use of the magistrates and foreign ambassadors, who were not permitted to enter the city. In later times it became a pleasure ground, with shaded walks, gardens, baths, theaters, and a race-course. Julius Cæsar built within it the marble halls for the comitia; Agrippa the baths and the pantheon; Augustus his own mausoleum; and Statilius Taurus the first stone amphitheater. Later emperors crowded this particular C. with public buildings and private residences. Under Aurelian it was taken in as a part of the city. The district in which the old C. was situated is now called Campo Marzo. Another ancient C. was the Sceleratus, the polluted field, where vestals who had been untrue to their vows of chastity were buried alive. The open grounds around modern colleges often bear the name of campus.

**CAMPVERE**, now called VERE, VEERE, or TER-VERE, a small fortified t. on the n.e. of the island of Walcheren, in the Netherlands province of Zeeland, 4 m. n.n.e. of Middelburg. It has a port on the Veersche Gat, which runs from the Sloe to the Roompot, separating Walcheren from North Beveland. The town has fallen into decay; but its former prosperity is indicated by the town-house of white freestone, with elegant tower, and the front ornamented by statues of several lords and ladies of the house of Borssele; and by the large and beautiful cathedral church which is no longer used. C. owed its name to the ferry (Dutch, *veer*) existing from thence to the village of Campen, in North Beveland, the site of the present hamlet of Kamperland.

From a historical point of view, C. is a town of great interest. In 1804, it was the scene of a battle between William, governor of Holland and Zeeland, and Guy, count of Flanders, who was victorious. In 1572, the Spaniards were driven away; and a century later, C. was the first town which proclaimed William III., the prince of Orange, general stadtholder. It is chiefly interesting as the seat of a Scottish factory for three and a half centuries. Wolfaard van Borssele, lord of C., having, in 1444, married a princess of the Stuart line, an impulse was given to the Scottish trade. A factory of merchants was formed, and by contract between the royal burghs of Scotland and the united provinces, C. became the only staple port. The goods could not be transferred to any other place until sold, merchants resorting thither to do business. The factors obtained many privileges, such as freedom from several duties and the right of being governed by the law of Scotland, having a lord conservator who was supreme judge in all matters. No factor might settle at C. without the written authority of the commissioners of royal burghs of Scotland, who took security for his honorable behavior. In 1795, the Batavian republic withdrew the privileges, and the factory was broken up, but the conservatorship was held as a sinecure long after the necessity for the office had ceased, the name of sir Alexander Ferrier appearing in the *Edinburgh Almanac* as "conservator at Campvere" so lately as 1847. The magistrates of C. were bound to provide a church for the factory, "to the end that the people of the Scottish nation be not frustrate of the Word of God and exercise of the reformed religion in their own proper language." The ministers were appointed by the commissioners of royal burghs, from 1618 to 1790, when the last appointment was made.

**CAMTOOS**, or GAMTOOS, a river of the e. division of the Cape Colony, of 200 m. in length. It rises in the Nieuwveld mountains, near lat. 32° s., and, flowing through the inland district of Beaufort, and the maritime one of Uitenhage, falls into that inlet of the sea which is immediately to the w. of Algoa bay. It is valuable as an aid to irrigation. For instance, Hankey, a station of the London missionary society on its banks, is thoroughly watered by means of a splendid tunnel carried through solid rock.

**CAMUCCINI**, VINCENZO, one of the most distinguished modern historical painters in Italy, was b. in Rome, 1775. The school of which he became the head was founded on the theatrical antique style of the French painter David. The first important works by C. were the "Assassination of Cæsar" and the "Death of Virginia;" both painted for lord Bristol at the commencement of the present century. His picture of "Unbelieving Thomas" was copied in mosaic for St. Peter's church. For the church of San Giovanni in Piacenza he executed a "Presentation in the Temple," which was greatly admired. These works were followed by many scenes from Roman history; among them, the pictures of "Horatius Cocles," and "Romulus and Remus" as children. C., who, as a man and an artist, was highly honored during his career, died at Rome, Sept. 2, 1844.

**CAMUS**, ARMAND GASTON, a prominent character in the French revolution, was b. in Paris, April 2, 1740. On account of his superior knowledge of ecclesiastical law, he was elected advocate-general of the French clergy. He was a zealous and ascetic Jansenist, and possessed of extraordinary firmness of character. He hailed the movements of 1789 with joy, and was elected member of the states-general by the people of Paris.

In this position, he appeared as the resolute foe of the ancient régime. He gained possession of, and published, the so-called *Red Book*, giving accounts of court expenditure, which was highly disadvantageous to the court and its ministers. After the flight of Louis XVI., C., with Montmorin, Lafayette, and Bailly, accused the king of treason and conspiracy, and insisted on the suppression of all orders and corporations based on hereditary rights. As conservator of the national archives, he rendered an important service by preserving from destruction the old documents of the abolished corporations and institutions. He was absent in Belgium during the king's trial, but sent his vote for death. In Mar., 1793, when he was commissioned to make prisoners of Dumouriez and other generals suspected of treason, C. himself and his four colleagues were taken prisoners and delivered over to the Austrians (April 8); but, after an imprisonment of two and a half years, he was exchanged for the daughter of Louis XVI. On his return to Paris, he was made member of the council of five hundred, of which he became president, Jan. 23, 1796, but resigned 20th May, 1797, and devoted his time to literature. Remaining, however, true to his principles, he voted, July 10, 1802, against Napoleon's proposed consulship during life. C. died of apoplexy, Nov. 2, 1804.

**CAMUS, CHARLES ETIENNE LOUIS**, 1699-1768; a French mathematician, associate of the Paris Academy of Sciences, and member of the Royal Society of London. In 1736, he accompanied Maupertuis and Clairaut in an expedition to Lapland to measure a degree of the meridian. He was the author of a *Cours de Mathématiques*, and several essays on mechanical and mathematical subjects.

**CAMWOOD**, or **BARWOOD**, a dyewood which yields a brilliant but not permanent red color, and is used along with sulphate of iron to produce the red color in English bandana handkerchiefs. It is the wood of *baphia nitida*, a tree of the natural order *leguminosæ*, sub-order *caesalpinieæ*, a native of Angola. It is preferred to Brazil wood (q.v.), as producing a finer and richer red.

**CA'NAAN**, the fourth son of Ham, and grandson of Noah. The posterity of Canaan were numerous, there being ten sons who were the fathers of as many tribes dwelling in Palestine and Syria. His eldest son, Zidon, is supposed to have been the founder of the city of Sidon. The whole of Palestine was called after the patriarch the "Land of Canaan." As to the curse pronounced by Noah upon Canaan and his descendants, there is no just reason to suppose that it was the immediate consequence of the unfilial conduct of Ham.

**CA'NAAN**. See **PALESTINE**.

**CA'NAANITES**, a collective name for the several nations conquered by the Israelites on the w. side of Jordan. Five, six, seven, and ten nations are mentioned in various places in the Old Testament; but of only two of them have we any collateral information—the Hittites, and the Amorites. And the former of these appears to have been included not with strict propriety among the Canaanites, evidence now tending to show that they not only dwelt beyond the border of Canaan, but did not even speak a Semitic language; nor were they homogeneous with other Canaanitish people. In general, the Canaanites are described as living in a state of political disintegration; the combined result of Semitic love of independence, and of varied conformation of the soil. Thirty-one of their petty kings are mentioned in the book of Joshua. That the Israelites were not immediately successful in conquering the C. is now universally recognized. The work of many years was concentrated by tradition on a single great name. The immediate result of the Israelite invasion was, not the extinction of the old, but the addition of a new element of stronger material, but less advanced culture. The chief object of Canaanitish worship was the dual-natured god of life and fruitfulness, Baal, or the Baal, "the lord," and his consort Ashérah, "the happy." The masculine form of the latter was the name of one of the twelve sons of Jacob. Ashérah must not be confounded with Ashtoreth or Astarte, who belonged to another type of Semitic religion. The symbol of Ashérah was the stem of a tree, though possibly sometimes carved into an image; that of the Baal probably had the form of a cone and represented the rays of the sun, or the generative power. It is these symbols which are referred to in the phrase "the Baals and Ashérah" (Judges iii. 7), where "the groves" of the king James's version is clearly a mistranslation. The licensed harlotry which formed a part of the worship of Ashérah was peculiarly obnoxious to the later Hebrew prophets, though, indeed, even the folk-lore of the Israelites shows traces of aversion to its attendant immorality. Another characteristic of the Canaanitish religion was soothsaying, and this was vigorously denounced by the conquerors (Deut. xviii. 10-14). There were relics of Canaanitish times in old traditions which the Israelites did not suppress, and it is alleged by uncompromising historical critics that some of the narratives in Genesis are revised and purified versions of Canaanitish legends. The most obvious of these are said to be the stories which are attached to localities in Canaan, such as Luz and Beersheba. The question whether a remnant of the old population of Palestine may not be still in existence is answered in the affirmative by several recent investigators, who find descendants of the C. in the fellahs or peasants of the Holy Land. From an ethnological point of view there seems to have been a close affinity of the three peoples, the Israelites, the C., and the Phœnicians, who appear to have

migrated successively from a Babylonian centre, and the last to move westward were probably the Hebrews.

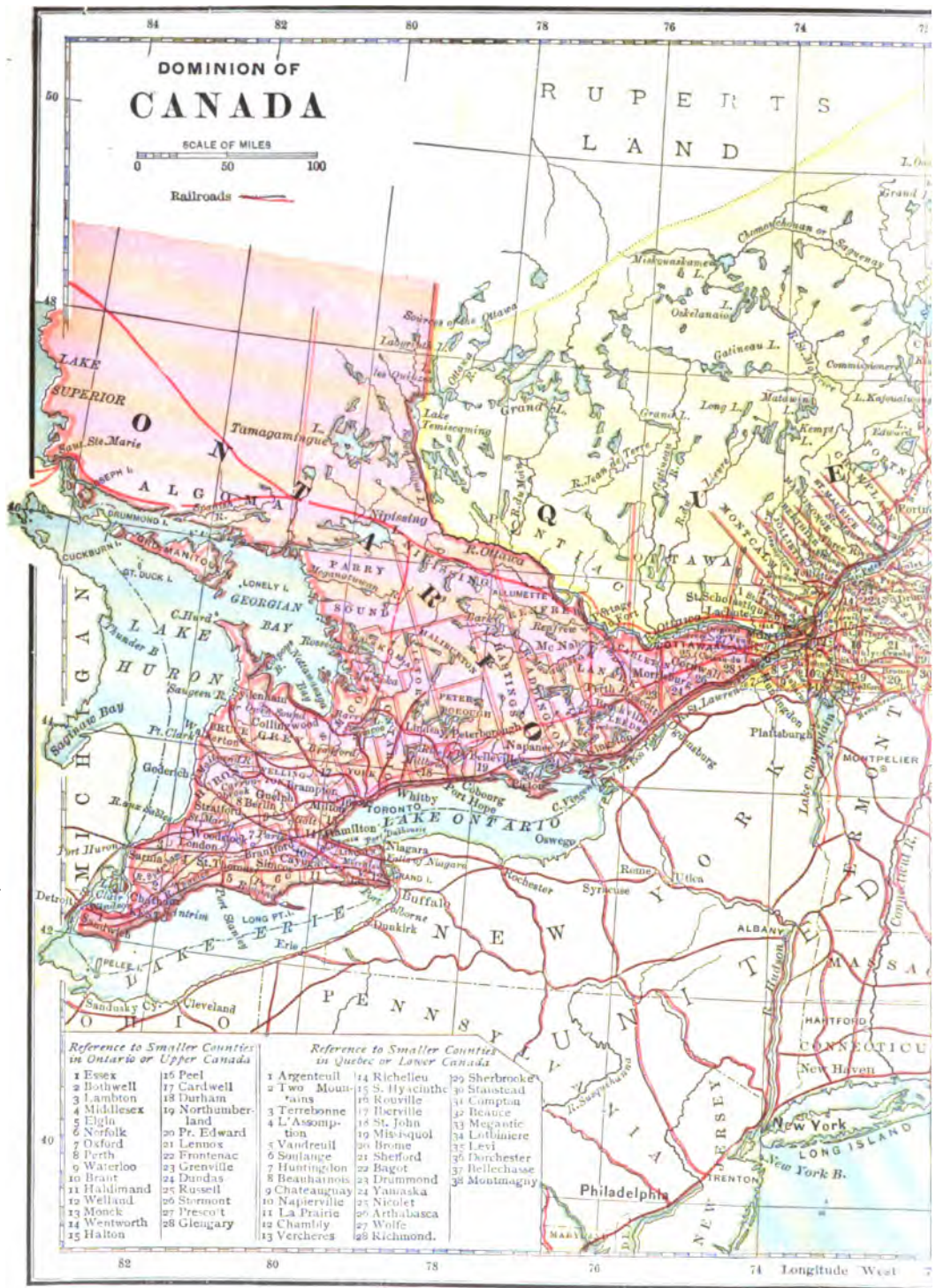
**CANADA, DOMINION OF**, occupies the northern part of North America between the meridians of 52° and 141° w. long., while its most southern point is 41° 45' n. lat. It is bounded on the north by the Arctic ocean; on the east by the Atlantic ocean, eastern Labrador and Newfoundland; on the south by the United States; and on the west by the Pacific ocean and Alaska. It is about 3500 miles in length from east to west, and has an area greater than the United States, including Alaska, and nearly as large as that of the continent of Europe, its land surface being 3,315,647 sq. m.; its gross area, 3,456,383 sq. m. The land surface is distributed as follows: Prince Edward Island, 2000 sq. m.; Nova Scotia, 20,550; New Brunswick, 28,100; Quebec, 227,500; Ontario, 219,650; Manitoba, 64,066; Assiniboia, 88,534; Saskatchewan, 101,092; Alberta, 105,355; Athabasca, 103,300; British Columbia, 382,300; North-west Territories and Arctic Islands, 1,811,555. The crown colony of Newfoundland, with its dependency, eastern Labrador (162,200 sq. m.), are not, of course, included. The name Canada is supposed to be derived from the Indian *kannatha*, a collection of huts, and to have been misapplied by Cartier to the whole country.

**History.** The "mound-builders" of prehistoric times, whose earthworks and sepulchral mounds are found in Manitoba and elsewhere, would appear to have been the early inhabitants of this vast country, and succeeding them, if not their actual descendants, were the Iroquois, Hurons, and other tribes. If we refuse the title of discoverer to Bjarne Hierulfen (see *ERIC THE RED*), who coasted along the shores of Labrador about 986, we must bestow it upon the Cabots, who visited Labrador in 1497 and, supposing it to be India, named its inhabitants "Indians." The first, however, to penetrate the interior was Jacques Cartier, a French navigator who, in 1534, entered the St. Lawrence on the festival of the saint of that title and took nominal possession of North America in the name of his king, Francis I. Returning in 1535, he ascended the St. Lawrence to Hochelaga (Montreal), and after passing the winter at Stadaconé (Quebec), went back to France. In 1603, 1604-1607, and 1608, Samuel de Champlain visited and explored parts of Canada, discovering the lake now bearing his name, and lakes Ontario and Nipissing, and founding Quebec, 1608. From this time on France claimed and ruled for 150 years the region from Acadie to lake Superior, and down the Mississippi to New Orleans. In 1670 the Hudson bay company (q.v.) obtained from Charles II. the exclusive right to trade in the territory watered by the tributaries of Hudson bay. The missions, forts, and settlements of the French were rapidly established over her domain, but the struggle with England began early, and in 1629 Quebec was captured, to be restored in 1632. In 1713 France restored to England Hudson bay, ceded Newfoundland, Acadie (Nova Scotia), and the Iroquois country, retaining only the valleys of the St. Lawrence and Mississippi. In 1759-60 Quebec, Montreal, and other strongholds were captured by the English, and the era of French dominion ceased. The French inhabitants of Canada were secured in the free exercise of their religion, peace was concluded between England and France in 1763, and a small part of the newly acquired country was organized by royal proclamation under English laws. In 1774 the new province was extended by parliamentary enactment (and under French laws) down the Ohio to its confluence with the Mississippi, and up the latter stream to its source. During the American revolution attempts were made to induce the British colonies of Canada and Nova Scotia to rebel, and in 1775 occurred the disastrous expedition against Montreal and Quebec of Montgomery and Arnold. In 1788 Canada was reduced in area by the cession to the United States of a territory now constituting the states of Minnesota, Wisconsin, Michigan, Ohio, Indiana, and Illinois; in 1791 it was divided under separate legislatures into two sections—the eastern retaining French institutions, and the western receiving those of England; and these sections, again, after political discontent had in each ripened into armed insurrection (1837-38), were re-united for legislative purposes in 1840, a union which was not successful. In 1867 Upper and Lower Canada, Nova Scotia, and New Brunswick were united as the Dominion of Canada; the Hudson bay company's territory was acquired in 1869, and in 1870 was divided into Manitoba and the North-west Territories, both being admitted into the confederation that year. Part of the North-west Territories was subsequently divided into districts as follows: In 1876, Keewatin; in 1882, Assiniboia, Saskatchewan, Alberta, and Athabasca. In 1871 British Columbia, and in 1873 Prince Edward Island, entered the union, Newfoundland standing aloof, as it does to-day. Other events were the Red river rebellion, in 1869; the treaty of Washington, in 1871, dealing with the fisheries and mutual use of canals, etc., and the award of the fisheries commission in 1877 (see *FISHERIES*); the adoption in 1879 of a higher customs tariff; the outbreak of the half-breeds under Louis Riel (q.v.) in 1885, and the completion of the Canadian Pacific railroad in that year; the unsuccessful attempt of Manitoba, in 1887, to construct the Red River Valley railroad; the signing of the treaty for the settlement of the fisheries disputes between Great Britain and the United States in 1888; and the agitation in Newfoundland, 1887-91, over encroachments by French fishermen, and the claimed lack of protection afforded the colony by the British government.

**Topography.** The most prominent physical features of the Dominion are the Rocky'













# POPULATION OF BRITISH COLUMBIA, MANITOBA, AND THE TERRITORIES.

(ROYAL CENSUS: 1891 AND 1881.)

## BRITISH COLUMBIA.

	1891.	1881.		1891.	1881.
Cariboo.....	4,959	7,550	Yale (est.).....	18,661	9,200
New Westminster....	42,226	15,417	Total .....	98,173	49,459
Vancouver.....	18,229	9,991			
Victoria.....	18,538	7,801			

## MANITOBA.

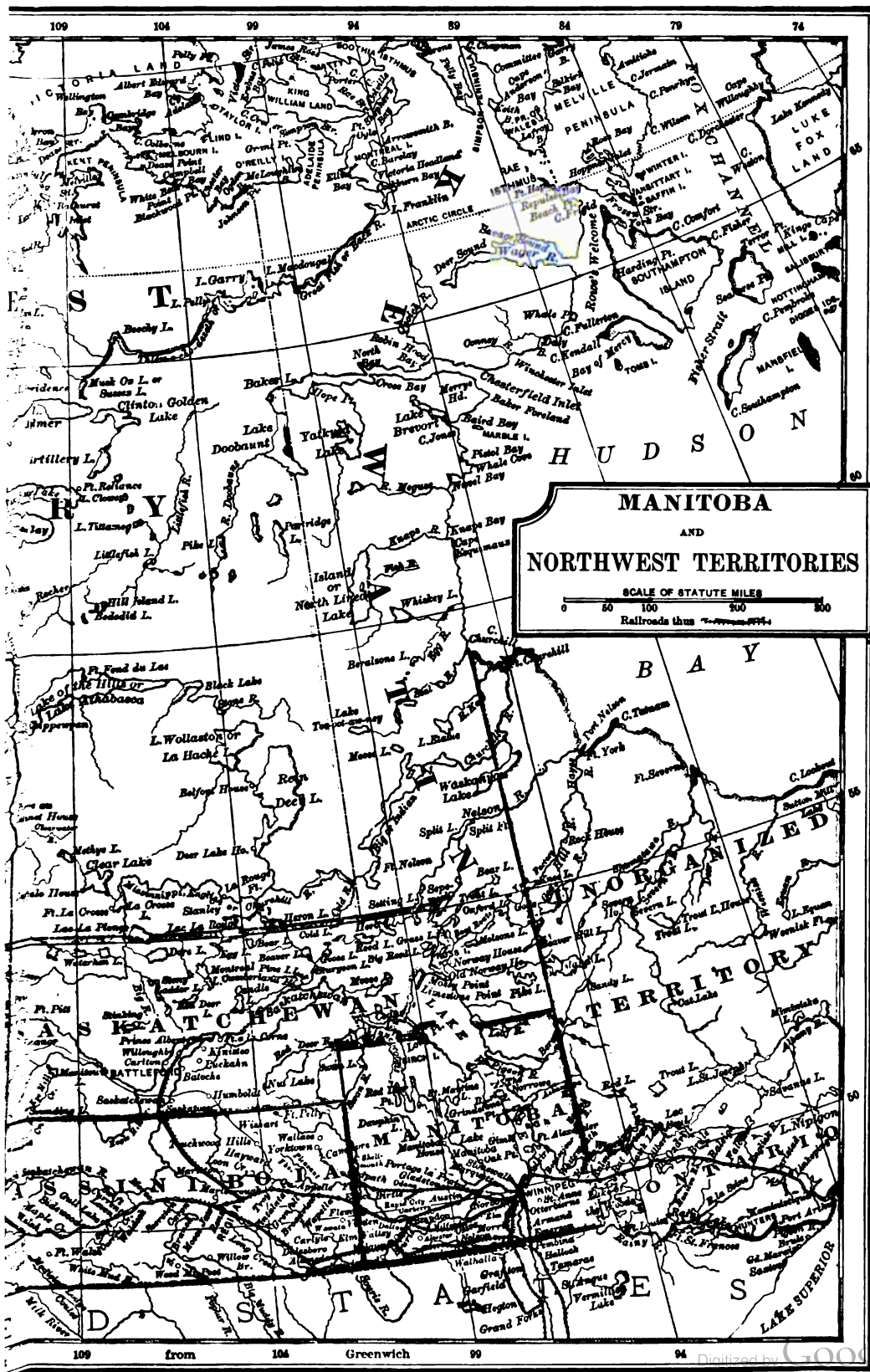
	1891.	1881.		1891.	1881.
Lisgar.....	22,103	12,679	Winnipeg.....	25,639	7,985
Marquette.....	86,069	15,449	Total .....	152,506	62,260
Provencher.....	15,469	12,496			
Selkirk.....	53,226	13,651			

## THE TERRITORIES.

	1891.	1881.		1891.	1881.
Alberta (est.).....	25,277	.....	Unorganized.....	82,168	30,981
Assiniboia.....	30,872	.....	Total .....	98,967	56,446
Saskatchewan.....	11,150	25,515			







# MANITOBA

AND

## NORTHWEST TERRITORIES

SCALE OF STATUTE MILES

0 50 100 200 300

Railroads thus 





mountain system and the ranges west of it, the Laurentian range, the great inland plain, and the inland lakes. The Rocky mountains extend in a northwesterly direction the whole length of the Dominion, and consist in many sections of triple chains with beautiful valleys between, the most easterly of these chains having the highest elevations. Of these, the chief are, Mt. Hooker, 16,760 ft.; Mt. Brown, 16,000 ft.; and Mt. Murchison, 15,700 ft. Just south of the latter peak the Central Pacific R.R. crosses the range through the Kicking Horse Pass at an altitude of 5300 ft. above the sea. In the east, the Laurentian range, forming the water-shed between the St. Lawrence and the Hudson bay river systems, has a length of 3000 miles and an average height of 2500 feet. South of the St. Lawrence are the Nôtre Dame, or Shickshock mountains, in Quebec, and hills of no great height in Nova Scotia and Cape Breton. In the eastern provinces the surface, as a whole, consists of hilly sections, sometimes heavily wooded, interspersed with extensive tracts of undulating and fertile land. The central portion of the Dominion consists of a vast undulating plain extending westward to the base of the Rocky mountains. The northern part of this great plain consists of three distinct prairie plateaux. The most eastern (in Manitoba) is familiarly known as the Red River Valley and Lake Winnipeg region. It has an average altitude of 800 ft., and is estimated to contain 7000 sq.m. of the finest wheat-land in the world. The second, with an average altitude of 1600 ft., and an area of about 105,000 sq.m., includes the Assiniboine and Qu'Appelle river valleys, and is unusually fertile. The third plateau, beginning with an altitude of about 2000 ft., extends westward for 455 miles to the foot of the Rocky mountains, where it attains an altitude of about 4200 ft. This section includes the western half of Assiniboia and the whole of Alberta, and is admirably adapted for grazing purposes. The northern part of this great central plain is a vast tract of forest and prairie, which has great agricultural and mineral resources. West of the Rocky mountains is a mountainous or hilly region consisting principally of short ranges, and detached groups of mountains interspersed with plateaux and valleys, and extending to the Pacific. The Cascade, the principal range, rises in some places to an elevation of 10,000 ft., and follows the general outline of the coast its entire length, also forming a part of the boundary between Canada and Alaska. In the plateaux west of the Cascades are the sage brush plains, which can never be cultivated to any extent for lack of irrigation.

The Selkirk range of the Rocky mountains has a glacier region of greater extent than that of Switzerland, and the Cascade range contains many extinct volcanoes. The coasts of Canada are broken by many deep indentations, forming magnificent harbors and sheltering bays. On the Atlantic coast are Hudson bay, really an inland sea, with an area of over 500,000 sq.m., a uniform depth of seventy fathoms, and never frozen except along the shores; the Gulf of St. Lawrence, 80,000 sq.m. in extent; the Bay of Fundy, remarkable for its tides, and the Bay of Chaleurs. On the Pacific side is Georgian bay, one of the most picturesque and remarkable bodies of water on the globe. The northern shores are bordered by a labyrinth of islands, some, like Baffin Land, being of immense size, while off the eastern coast are Prince Edward Island, Cape Breton, a part of Nova Scotia, and Anticosti, noted for its signal and wrecking stations. The principal islands on the western coast are Vancouver and Queen Charlotte. The great inland lakes on the southern border form a perfect system of navigation from near the heart of the continent to the Atlantic ocean, a distance of 2384 miles. Other important lakes in the North-west Territories are: Great Slave, 12,000 sq.m.; Great Bear, 10,000 sq.m.; Athabasca, or "swampy," 9000 sq.m.; in Manitoba and Saskatchewan, Winnipeg, or "Great Sea," 8500 sq.m., Winnipegosis, or "Little Sea," 1936 sq.m., and Manitoba, or "Strait of the Gods," 1900 sq.m. In Ontario, Lake of the Woods is of historical interest, as being the starting point for the international boundary in every treaty between the United States and Great Britain. The principal rivers are the Mackenzie, nearly 2500 miles in length, the Copper Mine, and Great Fish, flowing into the Arctic ocean; the Saskatchewan, or swift current, Assiniboine, and Red, emptying into lake Winnipeg; the Churchill, Severn, and Albany, into Hudson bay; the Fraser, flowing into the Pacific, the Columbia, which after a course of 1200 miles enters the United States, and the Peace, tributary to the Mackenzie. In the eastern provinces are the majestic St. Lawrence, draining an area of 330,000 sq.m., with its tributaries, the Ottawa, Richelieu, St. Maurice, and Saguenay; and the St. John, Restigouche, and Miramichi in New Brunswick. The mountain, river and lake scenery of Canada is remarkably varied in character and grand in its proportions.

The most important minerals found are coal, iron, gold, silver, copper, and galena, which are widely distributed, besides asbestos, pyrites, phosphates, manganese, cobalt, building-stones, and marbles of great variety. There are large coal deposits in Nova Scotia, and the coal region of British Columbia and the North-west Territories is of enormous extent. Petroleum and salt are obtained in several localities.

*Flora.* This includes about sixty species of trees, some of them peculiar to Arctic regions, while others are found generally throughout the northern United States, and that same statement applies to the plants. On the Pacific coast and its islands the common trees are the oak, yew, arbutus, dogwood, willow, aspen, poplar, alder, crab apple, and vine-maple, while the mountains of British Columbia and the North-west Territories are covered with dense forests of coniferous trees, among them the gigantic Douglas pine, the white, yellow, and balsam pine, the cypress, larch, Scotch fir, and Alaska cedar. The prairies are either treeless or have groves of second-growth



aspens, spruces, and birches. The valley of the St. Lawrence still contains some large forests of coniferous and deciduous trees, such as the white, red, and gray pine, red cedar, tamarack, ash, elm, beech, birch, the red, black, white, yellow, bird's-eye and sugar maple, hickory, butternut, black-walnut, chestnut, ironwood and hazel. The wild vine is abundant everywhere, and among small fruits are the plum, crab apple, red and choke cherry, strawberry, blackberry, raspberry, mountain and bog cranberry, gooseberry, red and black currant, and the blueberry, which is such an important article of commerce along the St. Lawrence and Saguenay. The flowers found on the prairies and mountains are numerous and beautiful, the ferns embrace many rare species, and the mosses, lichens, and fungi are very brilliant in color.

*Zoology.* Selecting a few names from the long list of animals, birds and wild fowl, and fishes, we mention the polar, black, brown, and grizzly bear, wolf, lynx, wildcat, fox, elk, caribou, moose, antelope, deer, wood-buffalo, mountain goat, big-horn, reindeer, musk-ox, beaver, porcupine, sea-otter, fur seal, and walrus; the swan, snowy-owl, pelican, bald-eagle, whooping-crane, horned lark, cross-bill, snow-bunting and hummingbird; the white whale, sperm-whale, narwhal, salmon, sturgeon, cod, mackerel, lake trout, brook trout, muskallonge, herring and pike. Lobsters and other shell-fish abound.

*Climate.* This is varied, but, on the whole, dry and invigorating, and the winters are rendered exhilarating by the lack of humidity. The numerous lakes of upper Canada help to neutralize the extremes in that section, Toronto seldom having more than six weeks of sleighing, while Quebec usually enjoys it for five or six months. The average winter for a large area of the country is about four and a half months, and for the settled portions the average summer includes June and September. British Columbia and the adjoining provinces have a delightful climate throughout the year, owing largely to the influence of the Kuro-Shiwo (q.v.), or gulf stream, of the Pacific. In 1884 the extremes of temperature at Toronto were 89.6° and -13.3°; at Montreal, 91.0° and -23.5°; of Halifax, 88.0° and -11.1°; at Winnipeg, 88.5° and -44.5°; at Victoria, 86.0° and 8.0°. The average annual rainfall at St. John, Newfoundland, is 58.80 inches, and at Toronto, 35.17.

*Agriculture.*—In 1891, 28,537,242 acres were returned as being improved land, and of this 19,904,826 acres were reported as under crop. The number of tilled acres is being rapidly increased. The eastern provinces are noted for their wheat, oats, barley, and buckwheat, and for their horses and cattle. Ontario's dairy farms and apple orchards are famed, and the Annapolis valley, in Nova Scotia, is one of the best apple-growing countries on the continent. The Isle of Orleans, below Quebec, produces very fine plums; Toronto and the country westward, choice melons, grapes, and peaches; and Manitoba and British Columbia supply the hardier fruits in profusion. The central provinces raise on their prairie lands immense crops of wheat, oats, and barley, and large numbers of horses and cattle. Manitoba vies with the Dakotas in the production of wheat, and Alberta and the North-west Territories have peculiar advantages as grazing regions, as well as for cereal crops. British Columbia, though not possessed of such large tracts of arable land as the other provinces, can still boast of its greater adaptability for fruit-raising. There are experimental farms in several places, the most important being those near Ottawa, and Brandon, Manitoba. There are no complete agricultural returns for the whole of Canada, but in 1891 there was a total yield of 42,144,779 bushels of wheat, 82,515,413 bushels of oats, and 52,663,704 bushels of potatoes. There were 1,470,572 horses, 4,120,586 cattle, and 1,733,850 swine.

*Manufactures and other Industries.*—There has been a rapid advance in manufacturing since 1878. In 1891 the capital invested was \$354,620,750; the wages paid were \$100,663,650; the hands employed, 370,256; the value of articles produced, \$476,198,886. Articles of wood, iron, and leather are chiefly manufactured. The total value of forest products in 1891 was \$80,071,415, the total cut of standing timber being 2,045,073,072 cubic feet; about 80 per cent. of the total was exported, leaving 1,431,551,150 cubic feet for home consumption. The mineral products in 1895 were valued at \$22,500,000, including coal, \$7,774,178; gold, \$1,910,921; nickel, \$1,360,984; and petroleum, \$1,201,184. The fisheries of the eastern and Pacific coasts are among the richest and most important in the world, while the fresh-water fisheries of the great lakes and rivers are also very fine. In 1894, the total number of men employed was 70,719, using vessels, boats, nets, etc., valued at \$9,439,116; value of the yield, nearly \$21,000,000. Of this amount, the value of the cod fisheries was \$4,225,896; the salmon, \$3,218,551; and the lobster, \$2,370,632. The catch of the seal-fisheries was 95,048 seals, value of fur seal skins, \$948,490. There are twelve Government fish hatcheries in operation. A treaty for the settlement of the fishery disputes between Canada and the United States was signed by the representatives of the governments in Feb., 1888, and was to be ratified in two years. In the mean time a *modus vivendi* was offered, providing that United States vessels might have all the privileges mentioned in the treaty on payment of a license fee of 150 dollars a ton.

The main points in the treaty were as follows: Canada had the right to fisheries within a three-mile limit of the general coast line, except in the case of bays ten miles wide or less, when the line was to be from headland to headland; also, certain bays were exempted entirely from the operation of the treaty. Fishing vessels belonging to the United States might land, sell or transship cargoes only in cases of distress, might enter ports for wood,

water, shelter, or repairs, and after obtaining a license (given without charge), for casual supplies or stores, excepting bait. Certain concessions were made in the matter of reporting at custom ports, and of dues for pilotage, harborage, etc. At any time when the United States should see fit to admit Canadian fish and fish products free of duty, then all restrictions as to landing cargo, purchasing bait, etc., were to be withdrawn until duty was again required. Pending the ratification of the treaty, the *modus vivendi* clause was deemed to be in force since 1889.

*Trade and Commerce.* The total value of the exports in 1895 was \$113,638,803; of imports, \$110,781,882; of imports for home consumption, \$105,252,511. The value of exports to Great Britain was \$61,856,990, to the United States, \$41,297,676, imports for consumption from Great Britain, \$31,138,414; from the United States, \$59,337,239. The excess of imports from the United States was due to purchases not supplied by Great Britain. The leading imports were wool and manufactures of wool, iron, steel, and manufactures of these metals, coal, and coke, and breadstuffs, the leading exports, lumber, and other forest products, animals and animal products, grain and other agricultural products. The trade in coin and bullion in 1895 was, imports, \$4,576,620; exports, \$4,325,319. The duty collected on imports aggregated \$17,887,269. The shipping of the Dominion in 1895 comprised 7,262 vessels of 825,837 aggregate tonnage. The number of seagoing vessels that entered and cleared Canadian ports was 27,876, of 10,976,829 tons, including 12,913, of 2,054,024 tons, Canadian.

*Banks and Postoffices.* Every bank, in making payments, is compelled to have a certain proportion of government notes, and must hold half, and not less than 40 per cent. in government notes. In 1895 there were 38 incorporated banks making returns to the government, with numerous branches. The capital paid up was \$61,800,700; the notes in circulation, \$30,807,041; total on deposit \$190,916,889, liabilities, \$229,794,822; assets, \$316,536,510. Postoffice savings-banks have been in operation since 1867; there are also government savings-banks in the maritime provinces, Manitoba, and British Columbia. In 1895 there were 731 offices of the former and 35 of the latter. The depositors in 1895 numbered 175,560, and the deposits amounted to \$44,450,498 in both kinds of banks.

*Canals, Railroads, Postoffices, etc.* The St. Lawrence system of navigation extends from the straits of Belle Isle to Duluth, 2384 miles, and for 71½ miles there are canals to overcome the rapids and the difference in level between Lake Superior and tide-water (800 feet). The most important of these canals is the Welland, 26½ miles in length, making a detour of Niagara Falls. It is 14 feet in depth, with 26 locks, and a total rise of 326½ ft. There are also other important systems in the eastern provinces, of which the Rideau is one of the oldest. There were in Canada, in 1895, 16,091 miles of railroad in operation. The principal systems are the Canadian Pacific (6,174 miles), and the Grand Trunk System (3161 miles). The first railroad in Canada was opened in 1836; the Canadian Pacific railroad was completed in 1885. In 1887 Manitoba passed a local act for the construction of a railroad through the Red river valley to connect with the railroad systems of the United States, but this was disallowed by the governor-general as conflicting with the monopoly clauses of the Canadian Pacific Railway act. An injunction being obtained, work ceased for a time, but the railroad was finally completed. The total paid-up capital of all railways, 1895, was \$894,640,559; of passengers carried, 18,967,580; freight tonnage, 21,524,421; earnings, \$46,785,487; and expenses, \$32,749,669. A railroad from Winnipeg to Port Nelson on Hudson bay is in progress, and is to connect with a steamship line to England. Port Nelson is 2966 miles from Liverpool, thus being nearer than either Montreal or New York. The Imperial and Dominion governments have decided to subsidize a line of steamers from Vancouver to Hong Kong and Japan, and establish a regular mail service over this route to the East, conducted by the Canadian Pacific Railway company. On June 30, 1895, there were 8,882 postoffices in the Dominion, and the number of letters sent during 1894-5, was 107,565,000. The revenue was \$3,815,456, and the expenditure, \$3,598,647. There were 28,815 miles (8,176 being government) of telegraph lines in 1895, and 68,244 miles of wire with 2,556 offices; also 44,000 miles of telephone wire, with 33,500 instruments.

*Religion.* There is no state church, but the Roman Catholic church in Quebec is guaranteed the privileges enjoyed previous to British possession. The Roman Catholic church in Canada has (census of 1891) 1 cardinal, 7 archbishops, 23 bishops, 1500 clergy, and 1,992,017 communicants (chiefly in Quebec). The Church of England has 2 metropolitans, 18 bishops, about 1000 clergy and 646,069 communicants. The Presbyterian Church in Canada, formed by the union, in 1875, of two distinct bodies, has 755,326 communicants; the Methodists, 847,765 communicants; the Baptists, 303,839 communicants; the Lutherans, 63,982 communicants; the Congregationalists, 28,157 communicants. Members of miscellaneous denominations number 123,111. The leading denominations have each one or more divinity schools.

*Education.* This is controlled by the governments of the several provinces, except in British Columbia and the Northwest Territories, where the schools are supported wholly by the general government. Education is more or less compulsory, except in New Brunswick. In Ontario, Quebec, and the Northwest Territories there are separate schools for Roman Catholics. In 1895, the public schools numbered 20,081. The total number of pupils was 923,660, and the expenditure for the support of these schools, including government grants, was \$8,323,097. There are also 112 universities and classical colleges, including Dalhousie, N. S. (founded 1820); M'Gill, Quebec (1821);

New Brunswick (1828); Toronto, Ont. (1828); Queen's, Ont. (1841); Laval, Quebec (1852); Manitoba (1877); and the Royal Military college, Kingston, Ont. (1874). The principal scientific societies are the Royal Society of Canada; Natural History Society of Montreal; Canadian Institute, Toronto; Nova Scotia Institute; Natural History Institute, New Brunswick; and Scientific and Historical Society, Winnipeg.

*Government.* Until 1849, Montreal was the capital; then the legislature met at Toronto and Quebec alternately until 1857, when Ottawa became the permanent seat of government. The executive authority is vested in the sovereign of Great Britain and Ireland, and is carried on in her name by a Governor-General, receiving a salary of \$50,000 per annum, and a Privy Council of fifteen heads of departments, which is responsible to the parliament. The legislature consists of two houses—a Senate of 81 members, nominated for life by the governor in council, and a House of Commons of 215 members elected every five years, unless sooner dissolved by the people. The number of representatives is in proportion to population and is readjusted after every census. In 1895 there were 24 senators and 92 representatives from Ontario; 24 senators and 65 representatives from Quebec; 10 senators and 20 representatives from Nova Scotia; 10 senators and 14 representatives from New Brunswick; 4 senators and 7 representatives from Manitoba; 4 senators and 5 representatives from Prince Edward Island; 3 senators and 6 representatives from British Columbia; and 2 senators and 4 representatives from the Northwest Territories. At the head of each province is a lieutenant-governor, appointed by the governor in council and paid by the Dominion, but responsible to the local legislature. In most of the provinces there are two houses of legislature. The territories are administered by a lieutenant-governor and a council, partly elected and partly nominated. The limits of federal and provincial jurisdiction are regulated by the British North America act of 1867, which is the constitution of the Dominion. The revenue for the year ending June 30, 1895, was \$33,978,129, of which \$25,446,199 was derived from customs and excise; the expenditure was \$38,182,005. The public debt was \$318,048,755; assets, \$64,973,828; net debt, \$253,074,927. The public debt has increased steadily since confederation, but the government has expended nearly \$200,000,000 on public improvements since that act. The Supreme Court, constituted in 1875, meets three times a year, and has appellate, civil, and criminal jurisdiction throughout Canada. Each province has its Superior Court, the maritime provinces have vice-admiralty courts, and there are county courts with limited jurisdiction in all the provinces.

*Army.* The eastern provinces and western Canada have neither natural barriers nor fortifications. Halifax and St. John, New Brunswick, are the only fortified places in Canada, properly speaking, but the erection of fortifications on the Pacific coast is contemplated. In 1871 the strength of the troops maintained by the Imperial Government was reduced to 2000 men, forming the garrison of the fortress of Halifax. There is a large volunteer militia force divided into an active force (volunteer and marine militia) and a reserve force. All male subjects between 18 and 60 may be called out to serve. In 1895 the active militia consisted of 36,041 officers and men, and the permanent militia, of 1227 officers and men. The number of men available for active service is about 1,000,000. The Dominion is divided into 11 military districts. There is a royal military college at Kingston. Quebec has a government cartridge factory, Halifax is the only imperial military station, and Esquimalt, British Columbia, the only naval station.

*Population.* In 1762 the French population amounted to about 65,000, confined to the immediate banks of the lower St. Lawrence and its tributaries; in 1791 Upper Canada had 50,000 inhabitants and Lower Canada 130,000. In 1860, the total population, exclusive of Indians, in the Northwest and Hudson bay territories, was 3,906,810—2,110,502 born in Great Britain and Ireland and 1,082,940 French; in 1871, 3,635,024; in 1881, 4,324,810; in 1891, 4,833,239; distributed as follows: Ontario, 2,114,321; Quebec, 1,488,535; Nova Scotia, 450,306; New Brunswick, 321,263; Manitoba, 152,506; British Columbia, 98,173; Prince Edward Island, 109,078; and the Territories, 98,967. The most populous cities and towns, 1891, were Montreal, 216,650; Toronto, 181,220; Quebec, 63,090; Hamilton, 48,980; Ottawa, 44,154; St. John, 39,179; Halifax, 38,556; London, 31,977; Winnipeg, 25,642; and Kingston, 19,264. Of the total population, 1891, 2,460,471 were males, and 2,372,768 females; 4,185,877 were born in Canada, and 647,362 elsewhere; and 1,992,017 belonged to the Roman Catholic church, 847,765 to the Methodist, 755,326 to the Presbyterian, 646,059 to the church of England, and 303,839 to the Baptist; the Indian population was estimated at 106,205 in 1892 and 102,275 in 1896, the largest number being in British Columbia and in Manitoba and the Territories. Of the total foreign-born population, 1891, 490,252 were born in various British possessions, and 157,110 in foreign countries, including 80,915 from the United States.

See Morgan, *Bibliotheca Canadensis* (Ottawa, 1867); Faillon, *Histoire du Canada* (Mont., 1865); the histories by Kingsford (8 vols., 1888), Bryce (1887), and Greswell (1890); Stewart, *Canada under Lord Dufferin* (1878); Collins, *Canada under Lord Lorne* (1884); Adam, *The Canadian Northwest* (1885); Aitken, *The Dominion of Canada; a Study of Annexation* (1890); Grant, *Picturesque Canada* (1884); Lovell, *Gazetteer and History of Canada* (1887-89); Marquis of Lorne, *Canadian Life and Scenery* (1885); Pettitot, *Traditions Indiennes du Canada Nord-ouest* (1886); *Her Majesty's Colonies* (Colonial Exhibition Handbook, 1886).

**CANADA BALSAM** is a kind of turpentine (q.v.) obtained from the balm of Gilead fr (*abies* or *picea balsamea*), a native of Canada and the northern parts of the United States. See **FIR**. It exists in the tree in vesicles between the bark and the wood, and is obtained by making incisions, and attaching bottles for it to flow into. It is a transparent liquid, almost colorless, and with an agreeable odor and acrid taste. It pours readily out of a vessel or bottle, and shortly dries up, and becomes solid. When fresh, it is of the consistence of thin honey, but becomes viscid, and at last solid by age. It consists mainly of a resin dissolved in an essential oil, and its composition is approximately : essential oil, 24 parts ; resin, soluble in boiling alcohol, 60 ; resin, soluble only in ether, 16.

It is the finest kind of turpentine obtained from any of the *conifera*, and was formerly employed for medicinal purposes, particularly as a stimulant for the cure of mucous discharges, and as a detergent application to ulcers. It is also used for a variety of purposes in the arts—as an ingredient in varnishes, in mounting objects for the microscope, in photography (q.v.), and by opticians as a cement, particularly for connecting the parts of achromatic lenses to the exclusion of moisture and dust. Its value for optical purposes is very great, and depends not only on its perfect transparency, but on its possessing a refractive power nearly equal to that of glass.

**CANADA CLERGY RESERVES.** See **POLITICAL PARTIES, CANADIAN**.

**CANADA GOOSE.** See **GOOSE**.

**CANADIAN POLITICAL PARTIES.** See **POLITICAL PARTIES, CANADIAN**

**CANADIAN RIVER**, rising in n.e. New Mexico, 25 m. n.e. of Santa Fé, running s. 150 m., and then e. near the bounds of the Indian territory and Texas, thence through the Indian territory, and emptying into the Arkansas river near the w. boundary of the state of Arkansas ; whole length about 600 miles.

**CANAILLE** (Fr. from Latin *canis*, a dog, and originally meaning "a pack of dogs"), a contemptuous name given to the populace, signifying the lowest class of the people, the rabble.

**CANAJOH'ARIE**, a t. and village of Montgomery co., N. Y., 55 m. n.w. of Albany ; pop. of village, 1890, 2089. There are fine stone quarries in the vicinity, and the town contains several factories.

**CANAL**, an artificial channel for water, formed for purposes of drainage, irrigation, or navigation, but now usually employed to designate only such cuts as are intended for the passage of vessels.

Canals date from a period long anterior to the Christian era, and were employed as a means of irrigation and communication by Assyrians, Egyptians, and Hindus ; also by the Chinese, whose works of this kind are said to be unrivaled in extent ; one of them, the Imperial C., having a length of about 1000 miles. For the most part, however, these early canals were of one uniform level, and hence exhibit no great skill or ingenuity ; and the moderns were content to follow the rudimentary efforts of the ancients in this way until the 15th c., when the invention of the lock (q.v.)—showing how canals might be generally and advantageously used for inland navigation in countries whose surface was irregular—gave a great impulse to this branch of engineering. The Italians and Dutch, for both of which nations the invention of the lock has been claimed, were the first to develop this kind of engineering in Europe. In France, the first C., that of De Briare, to form a communication between the Loire and the Seine, was opened in 1642. In 1681 was completed the greatest undertaking of the kind on the continent, the C. of Languedoc, or the C. du Midi, to connect the Atlantic with the Mediterranean. The length of this C. is 148 m., it has more than 100 locks, and about 50 aqueducts, and in its highest part it is no less than 600 ft. above the sea. It is navigable for vessels of upwards of 100 tons. It was not until nearly a century later that C. navigation assumed importance in England, through the sagacity, energy, and liberality of the duke of Bridgewater (q.v.), and his celebrated engineer, James Brindley (q.v.). The success of these works stimulated other public persons to engage in similar undertakings. Speculation in C. shares became a mania similar to that which overtook the people in connection with railways at a more recent period, and a crash ensued on the prospect of war in 1792. In the space at our disposal, we shall briefly consider the several kinds of canal. See **SUEZ** and **SUEZ CANAL : INTEROCEANIC SHIP CANAL**.

Canals may be divided into three general heads—viz., 1. Canals proper, i.e., entirely artificial channels, having no water running through them beyond what is necessary for their own purpose ; 2. Tidal, i.e., affected by the rise and fall of the tides ; and 3. Rivers rendered navigable by weirs built across them to increase their depth, and having a lock at one end for the ascent or descent of vessels ; and occasionally, when there is much fall, or any formidable obstruction in the river, by lateral cuts, with locks for part of their course.

Another division may be made (1) of ship-canals for the transit of sea-going vessels generally, from sea to sea ; these are necessarily of large dimensions, and must be crossed by swing or draw bridges ; and (2) of canals for the passage of mere boats or barges, generally without masts, so that they may be crossed by stone or other solid bridges. The

largest ship C. in Europe is the Great North Holland C., completed in 1825, which has a breadth of 125 ft. at the water-surface, and of 81 ft. at the bottom, with a depth of 20 feet. It extends from Amsterdam to the Helder, a distance of 51 m.; it thus enables ships of as much as 1400 tons burden to avoid the shoals of the Zuyder Zee. The surface of the water in this C. is below the high-water level of the German ocean, from which it is protected by embankments faced with wicker-work. The locks on this C. are 297 ft. long, 51 ft. broad, and 20 ft. deep. There is a similar C. from near Rotterdam to Helvoetsluis, to avoid the shallows of the Brill at the mouth of the Maas. Another great ship C. is the Caledonian C. (q.v.). The Forth and Clyde C. is also one on a smaller scale for the passage of sea-going vessels. Its length is 35 m.; its medium width is 56 ft. at the surface, and 27 ft. at the bottom, and its depth 9 feet. It has 39 locks, each 75 ft. long, and 20 ft. wide, and a rise of 155 feet. In constructing ship-canals, it is important to secure a sheltered entrance, one not likely to become silted up, and of sufficient depth to admit vessels at all times of the tide; and towing-paths on both sides are desirable.

The C. of the Loire is one of those aiding the navigation of a river. It has a width on the water line of 33 ft., and a depth of 5½ ft., the locks being 17 ft. broad, and 100 ft. long. The river Lea and the Mersey and Irwell Navigations in England, and the Welland C. in Canada, formed to connect lake Erie with lake Ontario, and avoid the falls of Niagara, are also among the most noteworthy works of this class; the river Thames, above the first lock at Twickenham, partakes also of the nature of a canal.

Many canals pass through long tunnels, some very low and without towing-paths, in which case the mode of propulsion is by the boatmen lying on their backs and pushing with their feet against the roof of the tunnel.

The great expenditure of water and time in "locking" have led to the trial of various other plans for overcoming differences in level. On the Great Western C., boats are raised and lowered by means of machinery, called a perpendicular lift. On the Morris C. (United States), boats are conveyed on a carriage up a railway inclined plane, from one reach to another.

Other matters engineers have to consider are an ample supply of water, by means of feeders and reservoirs to the summit-level; stop-gates at convenient distances, to shut off the water in case of damage to any part of the C.; means of drainage when repairs are necessary; and provision against leakage through the banks, by puddling or otherwise. The floor-line or bottom of a C. is usually made twice the width of the largest boat likely to enter the C., with an addition of 6 or 8 in. for play at each side, and the depth 12 or 18 in. more than the draught of the boat.

The introduction of railways has materially interfered with C. traffic, and some canals have been altogether abandoned. Many, however, still continue to prosper, as, for instance, the Grand Junction, the Lea Navigation, and the Trent and Mersey. It is estimated that the inland boat navigation constructed in Great Britain exceeds 4,700 miles. In the United States there are upwards of 4,000 m. of C., of which 1800 m. are in New York state. The C. system has also been very extensively carried out in France, which has a large mileage of artificial inland water navigation. A new canal, which shortens the distance from Amsterdam to the North sea to 15 m., has recently been completed. The harbor is near Wyk-aan-Zee, and the minimum width is to be 60 yards. This canal was constructed mainly by British capital and engineers.

There are traces near Corinth, Greece, of a canal projected by Alexander the Great, determined upon by Julius Caesar, and actually begun by Nero, though the work never progressed beyond a few hundred yards. This canal was to shorten the distance between the Mediterranean and the Black Sea, and work was commenced on it again in 1882. It is four miles long, a portion of the distance being through rock; it is 26½ ft. deep, with bottom width of 72 ft.; no locks; and with solid jetties built out into the sea at either end as protection to the entrances. Its estimated cost is about \$5,000,000. The Manchester ship-canal, connecting that city with the sea, was begun in 1887. It is to be 35 miles long, depth 26 ft., bottom width of 120 ft., and three sets of locks, at an estimated cost of nearly \$30,000,000. Owing to a bar at the mouth of the Neva, ships have never been able to reach St. Petersburg, but this has been obviated by a canal from Kronstadt to the capital, finished in 1884, at a total cost of \$7,200,000. It is 18½ miles long, 22 ft. in depth, and with a bottom width 275 ft., except near St. Petersburg, where it is only 207 ft. The canal systems of Canada are among the most important in the world. Of these, the St. Lawrence stands first, with its Welland canal 26½ miles long, depth 14 ft., and 26 locks, with a total rise of 326½ ft., and the ship-canal through Lake St. Peter, admitting vessels of 27½ ft. draught, or the largest merchant vessels afloat; also the Richelieu and Lake Champlain system, which, with the rivers and lake, and the Champlain canal, in New York, forms an inland water communication between Montreal and New York, a distance of 457 miles. A plan for utilizing the St. Lawrence system for steam communication between England and Chicago is now under consideration. For Cape Cod canal, see MASSACHUSETTS. The Black Sea and Azov canal, another between the Mediterranean and Red seas, and a plan for flooding a portion of the great African desert south of Algeria by a canal from the Mediterranean, are some of the most important schemes now under consideration.

Since the great extension of railroads in the United States, the building of canals has been almost suspended, except for mining or manufacturing purposes. For purposes of transportation, few have been commenced and very few enlarged or improved within the past half-century. The whole length of canals in the union is about 4,200 m., of which New York has over 1300 m., Pennsylvania 920, Ohio 800, Indiana 374, Virginia 225, etc. The most important is the Erie in New York, 363 m. long, connecting lake Erie with the Hudson river, finished in 1825 and enlargement finished in 1862, at a cost of more than \$50,000,000. The other large canals are the Delaware and Hudson, the great coal route to New York from the Pennsylvania mines, 108 m. long, completed in 1829, cost \$6,300,000; the Chesapeake and Ohio, 185 m., cost \$11,375,000; the Schuylkill Coal and Navigation company's canal, 108 m., cost \$18,207,000; and the Wabash and Erie, in Indiana, 374 m., cost \$6,000,000. There are 13 canals in New York, 14 in Pennsylvania, 5 in Ohio, 4 in Virginia, 2 in New Jersey, and 1 each in Delaware, Maryland, Indiana, Illinois, and Michigan. The Chesapeake and Ohio canal originated in a project formed by Washington as early as 1774, to make the Potomac navigable from tide-water to Cumberland, and to connect it by common roads and portages with the affluents of the Ohio w. of the Alleghanies. The war of the revolution postponed the scheme, but in 1784 it was again broached by Washington, and Maryland and Virginia appointed a joint commission, with him at the head, to investigate the subject. The result was the incorporation of a company to make the Potomac navigable from tide-water to the highest possible point by the construction of such locks as might be necessary for that purpose. Of this company Washington was the president until his election as president of the United States compelled his resignation. The project encountered many obstacles, until at last in 1820 it was abandoned as impracticable; when the board of public works of the state of Virginia took steps which led to the organization of a new company, which constructed the Chesapeake and Ohio canal from Georgetown to Cumberland, completing it in 1850. It passes through the Potomac valley to Paw Paw Bend, from which point it passes through the mountain by a tunnel 3,118 ft. long. The whole length of the canal is 184 m., its depth 6 ft., its width to Harper's Ferry 60 ft. at the surface and 42 ft. at the bottom. By means of 74 locks, 100 ft. long and 15 ft. wide, an elevation of 609 ft. is gained. All the water is supplied by the Potomac. The cost of the work was over \$11,000,000.

In 1891 steps were taken by the government looking to such a connection and extension of the different water-ways of the country as would give complete internal communication by water between the chief naval centres of the East—a matter of great military importance in case of foreign war and the blockade of our coast.

**CANALETTO**, or **CANA'LE**, the name of two Venetian painters, who have acquired a reputation for their landscapes and views of towns. The elder, **ANTONIO C.**, b. 1697, was the son and pupil of a theatrical decorator in Venice. He studied at Rome. He painted a numerous series of excellent views in Venice, among which that of the great canal are especially admirable for their fresh coloring, faithfulness, and the invention displayed in accessory objects. He came to England by the advice of Amiconai. He died in 1768, after having acquired both wealth and fame by his representations of English scenes, several of which are in Buckingham house, and are highly admired.

**BERNARDO BELLOTTO**, surnamed **CANALETTO**, nephew and pupil of Antonio, was b. at Venice, 1724, and attained high excellence as a painter, and also as an engraver on copper. He practiced his art in his native place, and afterwards in Rome, Verona, Brescia, Milan, and Dresden. Correct perspective, powerful effects of light and shade, and beautiful sky-tints, are the most prominent characteristics of his works. C. visited England, where, among several other excellent works, he painted a masterly interior view of King's College chapel, Cambridge. He died in Warsaw, 1780.

**CANANDAIGUA**, a village and co. seat of Ontario co., N. Y.; at the n. extremity of Canandaigua lake, 28 m. s.e. of Rochester, on the New York Central railroad, and the terminus of several lines of steamers. The village is celebrated for picturesque scenery and the elegance of its private residences. Among the public buildings are a fine courthouse, two orphan asylums, several churches, Canandaigua academy, and Granger Place School for Girls. There are banks, library and museum, electric lights and street railroads, water works, and sewerage system. Pop. '90, 5868.

**CANANDAIGUA LAKE**, in Ontario co., N. Y., 15 m. long by about 1 m. wide, 668 ft. above the tide and 437 ft. above lake Ontario, into which it is emptied by the Clyde and Seneca rivers. It is surrounded with high banks and charming scenery, and its steamboats are largely patronized by pleasure-seekers.

**CANANORE**, a seaport and military station of the district of Malabar, in the presidency of Madras. It is in lat. 11° 52' n., and long. 75° 26' e., being about 50 m. to the n. of Calicut. The town stands at the head of a bay, which, opening from the s., forms its harbor, while the fort and cantonments occupy the bluff headland, which shelters the inlet on the side of the Arabian sea. Besides pepper, grain, and timber, the neighborhood produces immense quantities of cocoa-nuts, which are largely exported to the northward, where they are said to be scarce. C. has been a British possession since 1791, having in that year been taken from Tippoo Sultan. Pop. '91, 27,400.

**CANA OF GALILEE**, called by the natives "Kefr Cana." This place, celebrated in Scripture as the scene of our Lord's first miracle, when he turned water into wine, is now a small village of a few hundred inhabitants, who are principally Greek Christians or Nazarenes, situated about 18 m. w. of the sea of Galilee, and 6 m. n. of Nazareth. At the entrance to the village there is a fountain of the clearest and most delicious water—the best, say the Christians of Palestine, in the world: from it, it is supposed, the vessels for the marriage-feast were filled; and near the fountain are also lying the fragments of a Roman column. A house is still shown as that in which the miracle was performed; and some earthen jars sunk into the floor are said to be the very jars in use on that day. A church was built over the spot, but it is now in ruins.

**CANARD**, a hoax, cheat, an absurd and sensational story. The origin of this application of the word *canard*, duck, is uncertain. Some derive it from the old phrase *vendeur de canard à moitié*, literally one who sells half a duck; that is, pretends to sell a duck, but cheats during the transaction; while others attribute its origin to the following marvelous tale, circulated by Cornelissen in order to try the gullibility of the public: Having at one time twenty ducks in his possession, he killed them one by one and gave their bodies to the diminishing number of survivors, who successively devoured them, until one out of the twenty was all that remained, and he had actually eaten his nineteen comrades. A corresponding expression in the United States is the term *roorback*, a fictitious narrative published for purposes of political advantage. It originated in 1844 from a story of some notoriety purporting to be an extract from the "Travels of Baron Roorback."

**CANARIE**, an antiquated dance supposed to have come from the Canary islands. Two persons danced before each other with extravagant gestures. It was a favorite dance in France in the time of Louis XIV., and it is mentioned by Shakespeare. The canarie is a species of gigue resembling the *loure*, only quicker in tempo. A good example is in the second suite of Couperin's *Pièces de Clavecin*.

**CANARIES**, or CANARY ISLANDS, a group of islands belonging to Spain in the Atlantic ocean, off the n.w. coast of Africa, in lat. 27° 40' to 29° 25' n., and long. 18° 25' to 18° 16' w., forming a Spanish province. The group consists of seven large and several small islets, with a joint area of about 2,808 sq. m., and a pop. of (1887) 291,625. The principal islands, proceeding from e. to w., are Lanzarote, Fuerteventura, Gran Canaria, Tenerife, Gomera, Palma, and Hierro or Ferro. The coasts are steep and rocky, and the surface is diversified with lofty mountains (the greatest elevation being attained in the *Pico de Teyde*, in the island of Tenerife, which has a height of 12,182 ft.), narrow gorges, and fertile valleys. All the islands are of volcanic origin. On the summits of the highest elevations, depressions, like those left by fallen cones of volcanoes, are almost everywhere found; and the steep declivities are marked by deep fissures, of which, usually, only one penetrates the depressed summit, and exposes to view the several strata of the volcanic rock. There are numerous torrents, but no rivers, and fresh water is very scarce in the southern parts of the islands, and especially in Hierro.

The researches of Humboldt and Von Buch led to the division of the botanical geography of Tenerife into five distinct regions. The first, or region of African forms of vegetation, extends to about 1800 ft. above the sea, and is marked by the growth of the date palm, sugar-cane, dragon's-blood tree, etc. The second region extends to the height of 2,800 ft., and produces vines, corn, maize, olives, chestnuts, etc., in luxuriance. This zone represents the vegetation of southern Europe. In the third region, rising 1200 ft. or so higher, we have laurels and evergreens. In the fourth, extending to above 6000 ft., we find vegetation nipped by cold and excessive dryness, snow falling several months of the year, and only the *pinus Canariensis* and other conifers flourishing. The fifth region attains an elevation of nearly 11,000 feet. Here are found a kind of *spartium* (broom) peculiar to this zone, with cedrine junipers, and one Alpine plant, *Arabis Alpina*. The barren mountain-peaks are just below the limit of perpetual snow, although in a cavern at the height of 11,000 feet above the sea, snow is said to be preserved throughout the year. All the rest of the islands are similar in character, with the exception of Fuerteventura and Lanzarote, which are less elevated, more abundantly wooded, and more luxuriant in vegetation generally.

Minerals are few, and of little importance. Near the sea, the general temperature ranges from 60°–66° F. in Jan., to 78°–87° F. in October. The rainy season lasts from Nov. to Feb.; from April to Oct., the weather is uniformly fine. The islands, however, suffer much from the e. and s.e. winds, which, blowing over the hot deserts of Africa, burn up vegetation, and generate disease. Very little wine is now produced, the grape disease having destroyed almost all the vines. Cactus plants, on which the cochineal insect feeds, now mainly occupy the desolated vineyards, and the value of cochineal exported has constituted the larger portion of the total value of the exports. Other products are cereals, tobacco, potatoes, barilla, oil, and fruits. The chief foreign trade is with the United States, England and Hamburg. There is little manufacturing.

TENERIFFE, the largest island of the group, has an area of 752 square miles, with a population of 106,081. In the n.w. of this island, which is the principal seat of the cochineal cultivation, is situated the famous Pico de Teyde, or peak of Tenerife (q.v.).

The chief town and port is Santa Cruz de Santiago on the n.e. coast. See SANTA CRUZ (Teneriffe).

GRAN CANARIA, which is next in importance, has an area of 531 sq. m. Its culminating peak is El Cumbre, with a height of 8,648 feet. The capital, Las Palmas (q.v.), on the e. coast, is the largest town of the archipelago.

PALMA has an area of 280 sq. m., and a pop. of 39,600. Its highest peak, Pico de los Muchachos, has an elevation of more than 7,600 feet. Capital, Santa Cruz de la Palma (q.v.), on the e. coast.

For administrative purposes the Canaries are reckoned as a part of Spain, and form the province of Canarias.

The C. are supposed to have been the Fortunate Islands of the ancients. The Carthaginians are said to have visited them, and Juba II., king of the two Mauritaniae, wrote an account of them that has been transmitted to us by Pliny. In modern times, the first account of them was furnished in the first half of the 14th c., by the crew of a vessel that had been driven among them by stress of weather. A Spanish gentleman obtained a grant of them from the pope; but when an attempt at settlement was made, the Spaniards were driven off by the natives. In the beginning of the 15th c., the Spaniards succeeded in obtaining a footing in the islands; but a difference having arisen with Portugal concerning them, it was not until 1493 that the authority of Spain was finally established. Since that time, they have remained attached to the Spanish crown. The Guanches, Berberes, and the natives of Hierro and Palma were the aboriginal tribes, but they have ceased to exist as distinct races, having amalgamated with Italians, Portuguese, Spaniards, Africans, Flemings, and Irish. They were a brave and intelligent race. See Pegot-Ogier, *The Fortunate Islands* (Eng. trans., 1882).

CANARIUM, a genus of trees of the natural order *amyridaceae*, natives of the south-eastern parts of Asia, the Malayan archipelago, etc. The fruit is a drupe. The kernel of the fruit of *C. commune* is eaten both raw and roasted; and in Amboyna, bread is made of it, which is generally in the form of rolls about a yard long and an inch thick. An oil is expressed from it, which is used both for the table and for lamps. The tree is about 50 ft. high. *C. eyleastre* also produces eatable kernels. *C. commune* is supposed to be one of the trees which yield elemi (q.v.), and *C. microcarpum* yields an oil very like copaiva, known in ship-building yards as dammar (q.v.).

CANARY, or CANARY BIRD, a beautiful little bird, very common as a cage-bird, and much esteemed for its musical powers. It is one of the numerous family of finches (*fringillidae*), and is *fringilla canaria* of Linnaeus. Some modern ornithologists place it in the genus *carduelis*, others in *linota*; it is indeed intermediate between these genera, the goldfinches and the linnets. Some make it the type of a genus or sub-genus, *canarius*. It is found in Madeira, the Canary isles, and the Cape Verd isles; frequents the neighborhood of human habitations; builds its nest of moss, feathers, hair, etc., in thick, bushy, high shrubs or trees; and produces four, five, or even six broods in a season. In its wild state, its plumage is greenish, or greenish-yellow, sometimes tinged with brown, and exhibits less variety and beauty than in domestication. It was brought to Europe in the beginning of the 16th century. It breeds readily in confinement, and seems thoroughly reconciled to its cage-life; but although canaries of long domesticated races sometimes excel in imitative powers and acquired strains, yet they are surpassed in loudness and clearness of note by some of the wild birds, which, when caught and imported, are occasionally sold for extraordinary prices. Even in confinement, the C. often breeds four or five times a year, laying from four to six eggs each time. The eggs are pale blue. The male assists the female in building the nest and in feeding the young. Besides seeds of various kinds, which are their principal food, canaries are very fond of bland green leaves, such as those of chickweed, a supply of which is very necessary for their health; and one of their favorite luxuries is sugar. The C. not unfrequently lives 15 or 16 years. It can be taught various notes and airs, and some even learn to articulate words. The rearing and training of canaries afford occupation to no small number of persons, particularly in the Tyrol. The C. hybridizes readily with some other species of finch, producing "mules," some kinds of which are valued as song-birds.—There are several species very closely allied to the C., one of which, a beautiful little bird, entirely yellow, with an orange crown, a native of Brazil, is sometimes sold in America as a song-bird, but its musical powers are very inferior to those of the common species. See work by Gedney (1884).

CANARY GRASS, *Phalaris canariensis*, a grass of which the seed is much used, under the name of *Canary seed*, as food for cage-birds, and which is, on that account, cultivated to some extent in the s. of Europe, and in certain districts of Germany and England. It is a native of the Canary islands, naturalized in the s. of Europe, and in many places in Britain. The chief seats of its cultivation in England are the counties of Kent and Essex. The seed is sown early, generally in Feb., yet the crop is not reaped till after the ordinary grain harvest, for which reason the cultivation of C. G. is seldom attempted in the northern parts of Britain.—This grass attains a height of 2 or 3 ft., and has a crowded, egg-shaped, spike-like panicle, from an inch to almost 3 in. long; the spikelets are one-flowered, very much laterally compressed, a rudimentary scale-like floret on each side of the perfect floret; the *glumes* winged on the keel, and with two strips of darker green on each side; the *paleae* awnless, shining, and at last firmly inclosing the seed. A fine flour is prepared from Canary seed, which is employed as dressing in fine



cotton-weaving, and for the finishing of silken stuffs. The groats and flour of this small kind of grain are also used in the Canary islands, in Barbary, and in Italy, as food, the flour being made into bread, which is very nutritious and pleasant.—Other closely allied species of *phalaris* produce a similar grain, but are inferior in productiveness and quality.—A grass, now generally referred to this genus, and sometimes called REED C. G. (*phalaris arundinacea*), is very common on the banks of lakes and rivers, and in other wet places in Britain, and throughout southern and central Europe. It differs very much in appearance from C. G., having a large spreading panicle, generally of a reddish color; and the glumes are not winged at the keel. It is a somewhat reed-like grass, 4 to 6 ft. high, with creeping roots, which help to secure river banks; and yields a great bulk of hay, but has been very generally despised as a coarse grass, fit only for littering cattle. The justice of this opinion has, however, been called in question, and the grass proclaimed to be very nutritious, and sufficiently acceptable both to horses and oxen when cut early. It may be mown twice a year. A variety with curiously striped leaves is well known in gardens, as *ribbon grass*, *gardeners' garters*, or *ladies' traces*.

**CANARY PLANT.** See TROPÆOLUM.

**CANARY WINE**, also known as TENERIFFE, is the produce of the Canary islands, and resembles Madeira; but the name is properly applied only to the Bidogne wine, which must be distinguished from the Malvoisie of the Canaries. The former is made from grapes gathered before they have ripened, and, when new, is crude and unpleasant; but in the course of two or three years, increasing in mildness as in age, becomes so much like Madeira, that it is often sold for it. Like Madeira, it is greatly improved by a voyage to the tropics. It is produced chiefly on the island of Teneriffe, and the trade in the wine is mostly carried on at the chief port of this island. The Canary of the island of Palma is inferior to Teneriffe, but may be consumed sooner, and has a pleasant flavor.

**CANASTER**, the name given to a rush basket in which tobacco is placed in Spanish America; hence is said to be derived the name canaster, now applied to tobacco of a certain kind.

**CANBY**, EDWARD RICHARD SPRIGG, LL.D.; 1819–78; b. Ky.; a graduate of West Point; served in the Florida and the Mexican war, and in the war of the secession; in 1863, made brig.gen. of volunteers, and maj.gen. in 1864. He was severely wounded on two occasions, and was often chosen for special and difficult duty. In 1866, he was commissioned as brig. in the regular army. In the winter of 1872–73, he was sent to make a settlement of the difficulties between the Modoc Indians and the whites of n. California and Oregon, and was holding a talk under a flag of truce near his camp when he was treacherously shot by Capt. Jack, one of the Modoc leaders.

**CANCALE**, a seaport of France, 10 m. e. of St. Malo, on the bay of St. Michael; famous for its oyster trade; pop. '91, 6578. In 1758, the duke of Marlborough here landed an English army of 14,000, intending to attack St. Malo, but returned without making the attempt.

**CANCAN**, a wild dance, or rather a series of violent gymnastic exercises, originated by the demi-monde of Paris. Though perhaps quite as decorously clad as the operaballet, the C. is considered out of the pale of respectable diversions. There is some resemblance between it and the wild orgies of the Bacchic or Dionysian festivals of ancient Greece.

**CANCAO**, **CANGAR**, or **KANG-KAO**, also known as PONTIAMUS or POTAIMAT, the capital of a small state in w. Cambodia, on the e. side of the gulf of Siam, at the mouth of the river Cancao, 10° 14' n and 105° 55' east. It was once the center of Cambodian trade, but in 1717 the Siamese drove out the merchants who had settled there, since which time the trade of the town has greatly decreased. The harbor is shallow, but there is a good depth of water in the river.

**CANCELING OF DEEDS AND WILLS.** The word cancel comes from the Lat. *cancelli* (lattice-work), and a deed was formerly said to be canceled when lines were drawn over it in the form of lattice-work. The word cancel is now used to signify any sort of obliteration.

The court of chancery in England gives relief against the effect of improper cancellation; on the other hand, it may order a deed which has been improperly obtained to be delivered up in order to be canceled. The effect of the cancellation is to make the deed void. If a deed is given up to be canceled, and the cancellation does not take place, it remains in force at law. But if an obligee deliver up an obligation to be canceled, and the obligor do not afterwards cancel it, and the obligee happen to get it again into his hands, and sue the obligor on it, the latter cannot plead its voidance, for the deed still remains in force at law—although here, too, equity would relieve, and decree according to the original cancellation. Where a deed is canceled by consent of the parties to it, it is thereby destroyed as to their interest under it, but third parties may still produce it in evidence. As to a will, its cancellation may have the effect of revoking it, if done with such intention.

In Scotland, the system of registration of deeds and other writings prevents the occurrence of many of the questions that arise in England on this head, but the intention and effect of the cancellation or destruction of documents would in most cases be a question of evidence; and where it is necessary to know the contents of the destroyed paper, its effect may be judicially declared by a form of suit called an action for *proving*

the *tenor*, as indeed may be done in an English court of equity by a bill to recover the contents of a lost document. In the Scotch law, again, a deed or other writing may be judicially canceled or set aside by an action of reduction, and the courts in England substantially exercise a similar jurisdiction.

It would appear that where a testator has prescribed certain forms for the authentication of his will, and such forms have either not been observed by him, or if observed, have, in some essential particular, been negatived by obliteration, an intention to revoke will be presumed. It is within the jurisdiction of the courts of the U. S. which possess chancery powers to order the cancellation of a deed. But where a deed has been properly executed and delivered, its mere cancellation will not divest the grantee's title. The Statute of Frauds provides that the cancellation of a will must be by the "testator himself or in his presence, and by his direction and consent." This is true in many states of the U. S. Cancellation to be effectual must be in accordance with the statute. In N. Y. a partial obliteration is not sufficient, but the will must be destroyed or formally revoked. Cancellation by an insane man will not revoke a valid will. There must always be the *animus revocandi*, and accidental cancellation is not a revocation.

**CANCELING OF LETTERS-PATENT.** The lord chancellor may cancel the queen's letters-patent, when granted contrary to the law, "which," says Blackstone, quoting sir Edward Coke, "is the highest point of his jurisdiction." See **LETTERS-PATENT, CHANCELLOR.**

**CANCELLARIA**, a genus of mollusks—class *gasteropoda* (q.v.), order *pectinibranchiata*—with univalve shells, sometimes regarded as belonging to the family *volutida*, or volute shells (q.v.), but now generally placed among *buccinida*, or whelks (q.v.). The spire is prominent, the last whorl ventricose, the surface reticulated, the mouth large, the columella plaited. All the recent species are natives of tropical or subtropical seas, and are found chiefly on sandy bottoms, at the depth of a few fathoms. The fossil species, amounting to 19, occur in the newer strata from the chalk upwards.

**CANCER**, a disease characterized by slow alterations of structure, or tumors in various parts of the body, occurring either simultaneously or in a certain order of succession. In many cases, an isolated tumor in an external part is the earliest symptom; it is then viewed as the starting-point of the disease, and is termed a *malignant tumor* (*tumor mali moris*), from its presumed tendency to infect the system, and to cause the reproduction of growths similar to itself. It is right, however, to remark, that upon the pathology of C. authorities are by no means agreed, some holding that a constitutional taint or *diathesis* must always precede any local development of C., and that the first growth in point of time (or primary C.) is therefore only the first of a series determined by a pre-existing cause in the blood or general system; while others hold that C. is originally a truly local disease, or even that a growth at first simple (*non-malignant* or *benign*), may, in consequence of local causes, *degenerate*—i. e., become cancerous, and infect the whole system with the morbid tendency thus secondarily acquired. The discussion of this disputed question involves statements of a too complicated kind to be in place here; but it is a question of considerable importance, as bearing on the probability or improbability of curing the disease by extirpating the primary tumor at an early stage of its development. All authorities are agreed that, when any trace of secondary C. exists, the removal of the parts affected gives scarcely any hope of a favorable result, and, accordingly, operations under these circumstances, unless merely for the relief of local suffering, are discountenanced by all respectable surgeons. The disease, however, is one of which the ignorant as well as the learned have a well-founded dread, and hence it presents a large field for the practice of imposture, and for that less deliberate, but often not less hurtful kind of quackery which is the result of pure ignorance, grafted on a meddlesome desire to do good. We propose to give such a sketch of the characters and progress of cancerous disease as may serve, in some degree, as a protection against ignorance on the one hand, and deception on the other.

The leading character of C. being a tumor or morbid growth in a part, it is important, in the first place, to observe that not all, nor even the majority, of morbid growths are cancerous. A very large proportion of growths, involving swelling or change of structure in a part, are either determined by a previous process of inflammation—leading to chronic abscess and induration—or belong to what is called the non-malignant order of tumors—e. g., cysts, fatty and fibrous tumors, simple hypertrophy of glandular structures, cartilaginous, bony, calcareous, and vascular growths. See **TUMORS**. Further, among the tumors admitted by general consent into the order of cancerous, there are widely different degrees of *malignancy* or *cancerousness*, so to speak; some having the tendency to spread rapidly, and infect the system at an early period, while others remain local for a considerable time, and may be removed while yet local, with good hope of a permanent recovery.

Now, the practical distinction, or *diagnosis*, to use the technical phrase, of these different tumors, is founded upon a very careful and delicate appreciation of the characters of the malignant and non-malignant tumors, considered as morbid products, and also upon a thorough knowledge of the anatomy and relations of the textures in which they arise. One of the leading characters of malignant tumors is the tendency to involve, by a kind of specific destruction or degeneration, the ultimate elements of the textures in which they arise and in which they spread. The attempt, therefore, to distinguish these from other growths, must always call for the highest qualities of the surgeon—large

experience, guided at every step by consummate science, and, in particular, by minute and thorough knowledge of natural structure. And the difficulties of the inquiry are such, that even in the dead body, or in a tumor excised from the living body, all the resources of the anatomist, aided by the microscope, will occasionally fail in distinctly and surely discovering the true character of the morbid structure.

The most common seats of C. are, among external parts, the female breast, the eye, the tongue, the lip, the male genital organs, and the bones; among internal organs, the liver, stomach, uterus, rectum, gullet, peritoneum, and lymphatic glands. Some of these parts are more liable to primary, others to secondary cancer. Thus, the female breast, the neck of the uterus, the lower lip, the scrotum, the extremity of the penis, are very often the seats of a single cancerous tumor, which in its early stage at least seems to be unconnected with any constitutional taint; while the liver, the bones, and the lymphatic glands are more frequently the seats of secondary or multiple cancerous tumors. There are also differences in the character of C. itself, apart from its anatomical seat, which are to be taken into account in estimating the probability of its being solitary. Some of these differences are regarded by pathologists as amounting almost to specific distinctions; thus, *scirrhus*, or hard C., observed most frequently in the breast, uterus, and stomach, is more frequently solitary than *encephaloid* (brain-like), otherwise called *medullary*, or soft C.; again, *melanosis*, or *melanic C.*, a variety charged with a brown or black pigment, is almost always multiple in its occurrence; while *epithelial C.*, or *epithelioma*, as it has been recently termed, of which examples are frequently found in the lip, scrotum, penis, or tongue, is so generally solitary as to have led some pathologists to place it in a class altogether apart from the truly cancerous growths, with which, however, it presents too many points of affinity in its fatal tendency to recur after operation, and to infect the lymphatic glands and other structures adjoining the part primarily affected. Again, there are certain varieties of fibrous and of cartilaginous tumor, as well as certain tumors of bone, and bone-like tumors developed in soft parts (osteoid), which must be regarded, in the meantime, as occupying a doubtful position between the malignant and non-malignant growths.

Generally speaking, a tumor may be said to fall under the suspicion of being C. when it more or less completely infiltrates the texture in which it arises, and passes from it into the surrounding textures; when it invades the lymphatic glands adjoining the part first affected; when it is attended by stinging or darting pains, or by obstinate and slowly extending ulceration, not due to pressure; when it occurs in a person having impaired health, or past the middle period of life, and is not traceable to any known cause of inflammatory disease or local irritation, nor to any other known constitutional disease, such as syphilis or scrofula. The probabilities are of course increased if the tumor be in one of the habitual seats of C., or if it be attended by evidence of disease in some internal organ known to be frequently thus affected. But it is hardly necessary to point out that the very complex elements of *diagnosis* here referred to ought to be always submitted to the scrutiny and judgment of a well-educated medical adviser, whose skill and personal character place him above suspicion, before the disease has assumed such a form as to be beyond the reach of remedial procedure. The patient who broods in secret over a suspicion of C., or who declines to apply for advice from a fear of encountering the truth, is in all probability only cherishing the seeds of future suffering; while if, as often happens, the suspicion is unfounded, a few minutes' careful examination would suffice to remove a source of misery which otherwise would poison the mind for years.

These remarks apply still more emphatically to the misguided persons who trust to the non-professional *cancer-curer*, or to the quasi-professional specialist. The charlatan, who pretends to hold in his hands a secret remedy for this most terrible disease, will invariably be found to pronounce almost every tumor C., and every C. curable. By this indiscriminating procedure, and by the fallacious promise of a cure without an operation, many persons who have never been affected with C. at all, have been persuaded to submit to the slow torture of successive cauterizations by powerful caustics, at the expense of needless mutilation and no small risk to life. In other cases, truly cancerous tumors have been removed slowly and imperfectly, at the cost of frightful and protracted sufferings, only to return at the end of a few weeks; and Mr. Spencer Wells has lately shown that in some notorious instances persons were reported as cured, when they had actually died of the disease at no long period after the supposed cure was stated to have taken place.

What is really known as to the cure of C., may be stated in few words. Modern pathological researches render it probable that a complete suspension of the progress of C. sometimes, though rarely, takes place; and individual tumors are found not unfrequently to undergo partial healing, or even to become entirely metamorphosed into inert cicatrices, while others, associated with them, continue to advance. The degree of rapidity of the advance of C. is also, as we have already stated, exceedingly variable. But these observations modify only to a very slight degree the general doctrine, that C. is a disease tending to a fatal issue, and hardly, if at all, under the control of remedies, as to its ultimate result. The removal of a cancerous tumor, indeed, is still resorted to by surgeons; and there appears to be no reasonable doubt that, when performed early, and in well-selected cases, it has been followed by long-continued exemption. But the occasional spontaneous arrest of such growths on the one hand, and the doubtful results

of operation in a large proportion of cases on the other, have combined to render surgeons of late years more chary of the use of the knife. In aged persons, in particular, the question often resolves itself into a calculation of the chances of life, founded on a great number of conflicting data, and only to be solved by a careful attention to the state of the general health, as well as to the rate of progress of the local disease. Operations are now very rarely performed after the lymphatic glands are involved, or when there is evidence of a deteriorated constitution, or of internal disease; but sometimes great pain, or profuse and exhausting discharge from an external tumor, may justify its removal, as a palliative measure, even under these unfavorable circumstances. For the mode of removal of cancerous and other tumors, see TUMORS.

Among the lower animals, this disease is more rare; nevertheless, cases are not unfrequent, presenting the same malignant characters as those observed in the human subject. Usually manifesting itself in the form of a specific tumor of some organ or tissue, there is a tendency to the invasion of other parts of the system, and the development of a constitutional state called the cancerous cachexia. M. U. Leblanc of Paris, the best veterinary authority on this subject, has shown that the dog and cat are most frequently affected with C.; and next in frequency come the pig, ox, horse, and mule. It has not been observed in birds, reptiles, or fishes. Females are more liable to C. than males. It is hereditary, but not transmissible from animals to man, or from one animal to another. It does not disappear under the influence of remedies, but, if possible, the tumors should be excised when first seen, and, if the knife fail to extirpate the malady, cauterization should be had recourse to. A relapse is almost certain; but Leblanc says there is greater chance for the patient, when a carnivorous animal, if it is kept on a strictly vegetable diet.

**CANCER**, the *Crab*, the fourth of the twelve constellations of the zodiac, usually represented on the globe as a crab, and denoted in works on astronomy by the sign ☏, which resembles the number 69 laid sideways. It contains, according to Flamsteed, 88 stars, of which the principal is *Acubens*, a star of the third magnitude. In the divisions of the ecliptic, the sign called C. occupies a place between 90° and 120° from the vernal equinox; but, owing to precession, the sign and the constellation have not coincided for nearly 2,000 years. See ECLIPTIC, PRECESSION, ZODIAC. Besides *Acubens*, it has two stars of the fourth magnitude, called by the Romans *Aselli* or the Little Asses; and a nebulous cluster of minute stars about 2° from the Asses, visible to the naked eye, and which goes by the name of *Præsepe*, or the Manger.

**CANCER.** See CRAB.

**CANCER, TROPIC OF.** See TROPICS.

**CANCER ROOT, or BEECH-DROPS, *Epiphegus Virginiana***, a parasitic plant of the natural order *orobancheæ* (q.v.), a native of North America, growing almost exclusively on the exposed roots of beech-trees. Like all the other plants of its order, it has a curious appearance, having scales instead of leaves. Its stem is branching, and produces distant alternate white flowers, streaked with purple. The whole plant is powerfully astringent; and the root is brownish, spongy, and very bitter and nauseous in taste. It has acquired, in its native country, the reputation of being a cure for cancer. All parts of the plant are used, and externally more than internally. This plant, in conjunction with white oxide of arsenic, is believed to have formed a medicine once famous in North America under the name of *Martin's cancer-powder*.—Another American plant of the same order, *Phelipæa biflora*, is sometimes also called C. R., and is used in the same way; and an infusion of the common broomrape (*orobanche major*)—a native of Britain and of the s. of Europe, parasitic on the roots of broom, furze, and other leguminous plants—has been employed as a detergent application to foul sores.

**CANCERIN, GEORGE**, Count, 1774-1845; a Russian statesman, educated in Germany, and employed in various capacities in Russian service. In 1813, he was commissary-gen. of all the forces, and in 1814, he accompanied the emperor Alexander to Paris. He was minister of finance from 1828 until his death. He was one of the few Russian writers on political economy.

**CANCERUM O'RI**, known also as *noma*, *water-cancer*, and *water-canker*, is a peculiar form of mortification, arising apparently from defective nutrition. The disease seldom occurs except between the 2d and 11th years, and is usually preceded by measles, remittent or intermittent fever, or some other serious disease. The following is the ordinary train of symptoms: more or less general disturbance of the system, accompanied by loss of appetite, followed by swelling of the salivary glands, and a profuse flow of saliva, which escapes from the mouth involuntarily during sleep; ulceration of the gums, which swell and become livid; looseness of the teeth; and the appearance of ash-colored spots on the gums and adjacent mucous membrane, which turn into dark-colored sloughy sores. These sores spread rapidly by a gangrenous process, expose the bone, and finally make a large aperture in the cheek. In some cases, the entire cheek has been destroyed in a very few days. Fortunately, this terrible disease is more rare in this country than in some parts of the continent, and most of the cases recorded are described by foreign writers. Van Swieten describes a case in which he saw the first set of teeth fall out, the second set destroyed, the lower jaw exfoliated, and the lips, cheeks, tongue, and chin eaten away before the child died. The obvious indications of treatment are to remove the patient to pure air, to administer tonics, nourishing food,

and (in moderation) stimulants; to touch the diseased parts with nitrate of silver, or glyceride of carbolic acid, and to wash out the mouth frequently with a weak solution of Condy's fluid.

**CAN'DACÉ**, queen of the portion of upper Nubia called by the Greeks Meroë, probably corresponding with the present province of Athbara, between 13° and 18° north. From its fortunate situation, Meroë became one of the richest countries in the world. Candace appears to have been the name of several female rulers in Ethiopia. The one here meant invaded Egypt 22 B.C., but was defeated by the Roman governor, Petronius, who destroyed Napata, the queen's capital city. The queen was leniently treated by Augustus. The high chamberlain or treasurer of Candace was converted to Christianity by Philip the Evangelist, and there is a tradition that through the efforts of this officer the queen herself was converted.

**CAN'DAHAR'**, or **KAN'DAHAR**, the capital of central or southern Afghanistan, situated about 200 m. to the s.w. of Cabool. It is in lat. 32° 37' n., and long. 66° 20' e., and has an elevation of 3,484 ft. above the level of the sea. It is in the form of an oblong square, while all its streets run straight, and cut one another at right angles. At the point of intersection there is a large dome (*chamsu*), 50 yards in diameter. Pop. variously estimated from 60,000 to 100,000. C. is well watered by canals drawn from a neighboring river, which send to almost every street its own adequate supply; and the same means of irrigation have covered the immediate vicinity with gardens and orchards. C. is a place of great commerce, trading with Bombay, Herat, Bokhara, Samarcand, etc. About 2 m. to the northward rises a precipitous rock, crowned by a fortress impregnable to everything but heavy artillery. Here, amid all the disasters of the Afghan war, the British maintained their ground. C. has been a pivot for the history of Central Asia during more than 2000 years. It is supposed to have been founded by Alexander of Macedon, owing, most probably, its name to the oriental corruption of Iskender or Scander, as in Scanderoon or Iskenderun of Syria. A comparative blank of upwards of 13 centuries in the history reaches to the famous Mahmoud of Ghiznee, who wrested the stronghold from the Afghans. From that epoch down to 1747, when the native rule was permanently established, C., with brief and precarious intervals of independence, was held by Tartary, India, and Persia in turn. In the war of 1878-79, the British entered C. unopposed.

**CANDAULES**. See **GYGES**.

**CANDEISH'**, or **KHANDESH**, a collectorate in the presidency of Bombay, containing 9044 sq. m., with a comparatively scanty pop. of about 1,250,000. It lies chiefly in the valley or basin of the middle part of the Tapti, which enters the gulf of Cambay below Surat; and it is bounded mostly by territories of nearly all the powerful native princes—the Nizam, Scindia, Holkar, and the Gulcowar. Through its situation, it necessarily suffered much from the long contest between the Mohammedans and the Mahrattas, and also from the struggles among the rival chiefs of the latter. Accordingly, when, in 1818, it fell to the East India company on the overthrow of the Peshwa, it presented little better than a scene of desolation, with ruined mansions, dismantled towns, and dilapidated temples. The difficulties of the new government were considerably aggravated by the Bheels, a more than half-savage race.

**CANDELA**, a t. of southern Italy, province of Foggia, 22 m. s. of the town of Foggia. Pop. 5,000. It is pleasantly situated on the summit of an eminence. The surrounding district is very fertile.

**CANDELA'BEUM**, a Latin word signifying properly a candlestick (from *candela*, a candle), but more frequently employed to mean a support for a lamp. There were, perhaps, no articles of furniture in which the ancients combined the beautiful with the useful to so large an extent as in their candlesticks and lamps. Candelabra usually stood on the ground, and were of considerable height—from 4 to 8, or even 10 feet. The most common were of wood; but metals of all kinds, including the precious metals, were used for their construction, and sometimes they were even adorned with gems. The candelabra found at Herculaneum and Pompeii are mostly of bronze. In the temples and palaces of the emperors, they were frequently of marble, and of great size and richness. They have usually a capacious cup at the top, either for the purpose of containing oil enough to feed a large flame, or that they might be used for burning incense. Though varying greatly in details, a general design runs through the forms of the candelabra of antiquity. They have all a foot or feet, a shaft, and a plinth on which a lamp is placed, or which is furnished with a socket for a candle. The base often consists of three feet of a lion, goat, griffin, or other animal real or imaginary. Sometimes a figure was introduced either into the body of the shaft, or placed on the top of it, in either case supporting the superincumbent portion of the C. on its head. Sometimes a figure was substituted for the shaft altogether, the receptacle for the oil being placed in one hand. In others, the shaft is a sliding one, like that of a music-stand, the object being, of course, to raise or depress the light at pleasure.

In addition to the various kinds of candelabra which, from their height, seem to have stood on the floor, the ancients had others intended to be placed on a table. These consisted either of a pillar or of a tree, and from the capital of the former, or the branches of the latter, lamps were suspended, as in the accompanying illustration, which we

copy from Smith's *Dictionary of Greek and Roman Antiquities*. The C., in this instance, including the stand, is only 3 ft. high. From the size of the stand in proportion to the rest of the C., it would seem to have been used for some other purpose.

**CANDIA**, in Turkish, "KIRID," called in the most ancient times *Idæa*, afterwards *Crete*, one of the largest islands of the Mediterranean, is situated at the entrance of the archipelago, in long.  $23^{\circ} 40'$  to  $26^{\circ} 40'$  e., lat.  $34^{\circ} 50'$  to  $35^{\circ} 55'$  n. It is very irregular in form, its length being about 150 m., and its breadth varying from 6 to 35 m.

The island of C. is for the most part mountainous, the mountains being chiefly composed of freestone or marble, which is either gray or white. Towards the s. side of the western part of the island there is a chain of high mountains, extending in length about  $37\frac{1}{2}$  m., which, from their appearing white, especially at their w. end, were anciently called Leuci. Mt. Ida, now called by the natives Psiloritis, is one in a chain of mountains extending to the n.w. of the island almost to Retimo; the mountain is of gray marble, and the surface loose stones: there is no verdure on it except a few small shrubs. Jupiter is said to have passed great part of his youth amongst these mountains in the exercise of hunting and drawing the bow.

The island abounds in springs and fountains, which are found even by the sea-side; most of the rivers are dry in summer, but in winter many of them are very dangerous torrents. The island does not produce any minerals of importance. The soil of C. is fertile. The products are olive oil, wheat, oranges, lemons, silk, wine, raisins, honey, etc. Large quantities of olive oil and soap are exported.

C. had once, according to Homer in his *Odyssey*, 90 cities; there are now only 8 principal towns: Megála Kástron, or Candia, pop. 24,600; Retimo or Rhithymnos, pop. 9000; Canea or Khania, pop. 15,000. The total population of the island, according to estimates based on the census of 1885, is 204,192.

The population is for the most part of Greek descent, about two-thirds of the inhabitants being attached to the Greek church. Among the rest the Turks predominate. There are a few Arabs and Armenians in the island. There are, however, many Greek Moslems in C., the worldly advantages which used to result from embracing Islamism having induced whole districts to abandon the faith of their forefathers; but their change of religious faith was unaccompanied by any change of language.

The history of C. commences with Greek mythology, and historians and poets say that it was governed by its own kings, among whom were Saturn, Jupiter, and Minos, 1300 years before Christ. C. was conquered by the Romans under Metellus, who, on that account, had the title of "Creticus"; on the division of the empire, it fell to the share of the eastern monarchs. In 823 A.D. it was conquered by the Saracens, who built the city of C. on the ruins of Heraclea. In 1204 it was sold by pope Boniface—to whom Baldwin I. gave it—to the Venetians. In 1645 the Turks besieged Canea, and in 1669 conquered the island, after a war which lasted 24 years. The Cretans sigh for a union with Greece, and have repeatedly risen in insurrection against Turkish rule, notably in 1866. At the Berlin congress in 1878, the Porte engaged scrupulously to carry out in C. the reformed system of government drawn up in 1868.

A revolt broke out in 1889 and the Turks withdrew many of the more liberal provisions which they had accepted in the government of the island. The Mohammedan *valis* ruled Crete from this time on and the discontent of the Christians broke out in another revolt toward the end of 1896. A Turkish attack on the insurgents near Apokorona, December 10, 1895, was unsuccessful, but on receiving reinforcements, the Moslems seized a number of the Christians. The conflicts continued, and in the spring of 1896 the Sultan recalled a decree which he had issued, postponing the meeting of the general assembly. On May 25th, 1896, the Turkish soldiery murdered and pillaged the Christians in the vicinity of Canea, but the insurgents remained in possession of several districts. At last the pressure of the Powers upon the Porte resulted in an order convoking the national assembly at Canea and a Christian was appointed governor-general, though the Turkish governor was retained as military governor. In July a proclamation declaring general amnesty was issued, but the Turkish troops again attacked the insurgents. It was now proposed that the Powers should blockade the island to prevent the insurgents from receiving aid from Greece. England refused to comply with this request. A revolutionary assembly was formed by the insurgents and it was therein decided to await the action of the Powers. Toward the end of August the Sultan gave it out that he would accept the terms recommended by the foreign ambassadors at Constantinople. The terms were the appointment of a Christian governor for five years, subject to the approval of the Powers and in general the autonomy of the island, save for an annual tribute to Turkey. The Sultan agreed to this, but there was much delay in the execution of the reform. The Cretans complained that, though Turkey agreed to introduce such reforms as should be "adjudged equitable," nothing would be done because Turkish promises were never carried out unless enforced by the Powers. Unless, therefore, the Turkish army was withdrawn and Crete annexed to Greece, they had no grounds for supposing that the reforms would ever be introduced, or that the island ever would be pacified. In 1897 the Powers established a "pacific blockade" of the island of Crete, and threatened to blockade Athens, at the same time holding out the hope that new privileges would be obtained from Turkey and that the island would acquire autonomy. In the meanwhile, Greek troops joined the Cretans, and in April, 1897, Greek irregulars, said to be under the leadership of regular officers, became involved in war on the fron-

tiers of Macedonia. On April 14, 1897, the Porte declared that war existed, owing to the aggressions of the Greeks, and this declaration was accepted by the Greek government, which, however, disclaimed all responsibility for the rupture, charging the Turkish troops in Macedonia with being the aggressors. See GREECE.

**CANDIA**, or **MEGALA-CASTRON**, formerly the capital of Candia or Crete, on the n. shore of the island,  $13^{\circ} 20' N.$  and  $25^{\circ} 9' E.$  It is surrounded by fortifications built by the Venetians, but which are now out of repair; and much of the town has also been much injured by earthquakes. Candia occupies the site of the ancient Heracleion, the seaport of Gnosus. The present city was founded by the Saracens in the 9th c.; was fortified in the 12th c. by the Genoese, and greatly strengthened by the Venetians in the following three centuries. It was taken by the Turks in 1669 after a stubborn defense by the Venetians, who lost 80,000 men. Population, about 24,600.

**CANDIAC**, **JEAN LOUIS PIERRE ELIZABETH DE MONTCALM DE**, 1719-26; a child of wonderful precocity, b. in Nîmes, France. At four years of age he read Latin, either printed or written; at six he understood Greek and Hebrew, had a remarkable acquaintance with arithmetic, history, geography, and heraldry, and had read many of the best authors.

**CANDIDATE** (Lat. *candidatus*). Among the Romans, a suitor for the office of consul, quæstor, prætor, etc., was named C. because, in appearing before the people, he wore a white (*candida*) toga without a tunic. His dress was chosen partly as an ostentation of humility, and partly as it served to display wounds received in battle. The candidature commonly lasted two years: in the first year, the C. was proved by the senate, whose decision, if favorable, was ratified by the popular assemblies; and, in the second, his name was entered in the list of candidates. During this period occurred the *ambitio*, or canvassing of voters, which often gave occasion to enormous bribery, in spite of the severe enactments passed to prevent the corruption of the electors. The elected C. was styled *designatus*.

In the early Christian church, newly baptized converts were styled **CANDIDATES**, on account of the white garments worn during eight days after baptism. In modern times, a German probationer or theological student who has been approved before the highest ecclesiastical authorities, is called a C.; but a still broader signification is also attached to the word, an applicant for any office whatever, religious or secular, being termed a candidate.

**CANDLE**, a cylinder of wax or fatty matter, with a wick, intended for giving light. Candles are made principally of tallow; also of the solid portion of palm and cocoa-nut oils, bleached wax, spermaceti, and paraffin, and other oily substances found in coal, shale, and gas-tar. They are either dipped, molded, or rolled. "Dips" are made by stretching a number of wicks upon a suitable frame, so that they may hang down at a distance from each other equal to about double the intended thickness of the C.; these are then dipped in a trough of melted tallow, and hung upon a rack until cooled, then dipped again and again, until the required thickness is obtained. The dipper has a number of frames prepared before commencing, and by the time he has dipped the last, the first is cool enough to dip again. The tallow in the trough has to be kept only a little above its melting point, for if it were much hotter, it would melt away a portion of the tallow already on the wick, instead of adding to it. Tallow-candles are much improved by being kept a year or a winter before using.

Molds, or mold-candles, are cast by pouring the tallow down a pewter tube, along the axis of which the wick has been previously fixed. These tubes are well polished in the inside, and several are fitted in a frame, the upper part of which forms a trough, into which the molds all open: thus, by pouring into the trough, all the molds are filled at once.

Wax-candles are not molded, on account of the great amount of contraction which wax undergoes in cooling, and the difficulty of drawing it from the molds. The wicks are warmed, and suspended over a basin of melted wax, which is poured over them until they acquire the proper thickness; they are then rolled, while hot, between two flat pieces of smooth hard wood, kept wetted to prevent adhesion.

Great improvements have recently been made in the manufacture of candles, and these are especially interesting from being the direct results of the progress of scientific chemistry—of theory applied in practice. All oils or fats are composed of one or more fatty acids combined with a base, called glycerine. The fatty acids constitute the combustible and more solid portion of the compound. Both acid and base are very weak, and it is a general law in chemistry, that a strong base, under favorable conditions, will separate a weaker one from its acid, by combining with the acid, and taking the place of the weak base; and a strong acid will in like manner displace a weaker one. Lime is a strong base, and being cheap, is used to separate the glycerine from the fatty acid of tallow, palm-oil, etc. This it does when the melted fat is stirred for some hours with a mixture of lime and water. The lime forms a hard insoluble soap, by combining with the fatty acid, and the glycerine remains in solution with the water. This lime-soap is then broken to powder; and the weak fatty acid separated by means of sulphuric acid.

which combines with the lime, forming sulphate of lime. The whole being heated, the fatty acid floats on the top, is skimmed off, and the candles made from it. These are called composite candles; they give a purer light than ordinary tallow, from being freed from the glycerine, which not only softens the fat, but diminishes its combustibility. Pure stearic acid, or stearine, the chief fatty acid of tallow, is a hard crystalline substance, perfectly dry, and free from any greasiness, with a somewhat pearly luster. Its crystalline structure presents a difficulty in the manufacture of candles, for when cast in molds, it contracts on cooling, and leaves small spaces between the crystals. This has been obviated by mixing a little arsenic with it; but this method is now abandoned, on account of the poisonous gas evolved by the combustion of such candles, and the desired effect is obtained by mixing the stearine with a little wax, and pouring it into hot molds.

To obviate the necessity of snuffing candles, several contrivances have been adopted; in all of them, the object is effected by causing the wick to bend over and its end to fall outside of the flame, and thus, by coming in contact with the oxygen of the air, to be completely burned—for such combustion cannot take place within the flame. See **FLAME**. This bending over is variously brought about. One method is by twisting the wick with one strand shorter than the rest, which is strained straight while the candles are being cast; and when released by the melting of a portion, it contracts, and bends the wick. Another method is by adding on one side of the wick a paste, consisting of a mixture of borax, bismuth, flour, and charcoal. Another, by coating one of the threads of the wick with a metallic envelope, by dipping it in fused bismuth; the metal fuses at the end of the burning wick, and forms a small globule, which bends the wick over, and is itself readily combustible at a red heat. These are called *metallic* wicks. Various other contrivances have been adopted for the same object. Price's manufactory of "patent" candles, as these improved candles usually are called, is perhaps the largest in England. It is situated at Vauxhall, in the neighborhood of London, and its economic arrangements have attracted not a little public attention. *Paraffine* (q.v.), a white crystalline body, obtained by distillation from cannel coal, etc., affords a beautifully white and clear material for candles, and having thus in a great degree the properties of wax at a much smaller expense, it has lately been much used for this purpose. *Ozokerit* is another oily mineral substance used for candles.

Candles were early introduced—with symbolical signification—into Christian worship, and are still so employed in the Roman Catholic church. In the church of England, candles are sometimes placed on the altar; but the practice is a subject of controversy. The numerous superstitious notions and observances connected with candles and other lights in all countries had a more remote origin, and may be considered as relics of the once universally prevalent worship of the sun and of fire. Numerous omens are taken from them, and they are also used as charms. In Britain, a portion of the tallow rising up against the wick of the candle, is called a winding-sheet, and regarded as a sure omen of death in the family. A bright spark at the candle denotes that the party directly opposite is to receive a letter. Windy weather is prophesied from the waving of the flame without visible cause, and wet weather if the wick does not light readily. Lights appearing to spring up from the ground, or issue out of a house, and traverse the road or air by invisible agency, the superstitious in Wales and elsewhere call *corpes-candles*. They are ominous of death, and their route indicates the road the corpse is to be carried for burial. The size and color of the light tell whether the fated person is young or old. It is or was customary in some places to light a candle, previously blessed, during the time of a woman's travail. C. were supposed to be efficacious after death as well as before birth, for they were placed on the corpse. The object was doubtless to ward off evil spirits, who were supposed to be always on the alert to injure souls on entering and on quitting the world. See also **CANDLEMAS**.

**CANDLEBERRY, CANDLEBERRY MYRTLE, WAX TREE, WAX MYRTLE, TALLOW TREE, or BAYBERRY, *Myrica cerifera***, a small tree or shrub of 4 to 18 ft. high, but generally a low-spreading shrub, a native of the United States of America, but most abundant and luxuriant in the south. It belongs to the natural order *amentaceae*, suborder *myricaeae*, according to some, a distinct natural order, distinguished by naked flowers, with 1-celled ovary, a drupaceous fruit (stone-fruit)—the scales becoming fleshy—and a single erect seed. The genus *myrica* has male and female flowers on separate plants; and the scales of the catkin, in both male and female flowers, are concave. The C. has evergreen oblongo-lanceolate leaves with two small serratures on each side at the point, sprinkled with resinous dots. The bark and leaves when bruised emit a delightful fragrance. The drupes—properly called berries—are about the size of peppercorns, and when ripe are covered with a greenish-white wax, which is collected by boiling them and skimming it off, and is afterwards melted and refined. A bushel of berries will yield 4 or 5 pounds. It is used chiefly for candles, which burn slowly, with little smoke, and emit an agreeable balsamic odor, but do not give a strong light. An excellent scented soap is made from it.—*M. gale* is the SWEET GALE of the moors and bogs of Scotland, well known for its delightful fragrance, a native of the whole northern parts of the world. Several species are found at the Cape of Good Hope, one of which, *M. cordifolia*, bears the name of **WAX SHRUB**, and candles are made from its berries.



**CANDLE-FISH**, or *EULACHON*, *Thaleichthys Pacificus*, a remarkable fish of the family *salmonidae*, nearly allied to the capelin (q.v.), and, like it, strictly a sea-fish approaching the coasts to spawn, but not entering rivers. The candle-fish inhabits the Pacific ocean, near the western shores of America, from Vancouver's island northwards. It is not larger than a smelt, has a somewhat pointed and conical head, a large mouth, teeth on the pharyngeals, and the tongue rough, but the lower jaw, palatines, and vomer destitute of teeth. The color is greenish olive on the back, passing into silvery white on the sides and belly, sparsely spotted with dirty yellow. It is probably the fattest or most oleaginous of all fishes, or indeed of animals, and is used by the Indians not only as an article of food, but for making oil. To broil or fry it, is nearly impossible, because it almost completely melts into oil. Indeed, the Indians often use it, in a dried state, as a lamp for lighting their lodges, merely drawing through it a piece of rush pith, or a strip from the inner bark of the "cypress tree" of these regions, *thuja gigantea*—a species of arbor vitae—as a wick, a long needle of hard wood being used for this purpose, and the fish being then lighted at one end, burns steadily until it is all consumed. In order to use the dried fish for food, the Indians often melt it into oil, by the application of heat, and drink the oil. It is also eaten uncooked. Drying is accomplished without any gutting or cleaning, the fish being fastened on skewers passed through the eyes, and hung in the thick smoke at the top of sheds in which wood fires are kept burning. They soon acquire a flavor of wood-smoke, and the smoking helps to preserve them. They are then stowed away in large frails, made from cedar-bark or rushes, in order to be used for food in winter. Immense shoals of candle-fish approach the shores in summer, and are caught in moonlight nights, when they come to sport at the surface of the water, which may often be seen glittering with their multitudes. The Indians paddle their canoes noiselessly amongst them, and catch them by means of a monster comb or rake—a piece of pine-wood from 6 to 8 ft. long, made round for about 2 ft. of its length at the place of the hand-gripe, the rest flat, thick at the back, but having a sharp edge in front, where teeth are driven into it about 4 in. long, and an inch apart. These teeth are usually made of bone, but the Indian fishers have learned to prefer sharp iron nails when they can get them. One Indian, sitting in the stern, paddles the canoe; another, standing with his face to the bow, holds the rake firmly in both hands, the teeth pointing sternwards, sweeps it with all his force through the glittering mass, and brings it to the surface teeth upwards, usually with a fish, and sometimes with three or four, impaled on each tooth. This process is carried on with wonderful rapidity. When a sufficient quantity of candle-fish has been dried for winter, the rest that are caught are made into oil, being for this purpose, piled in heaps until partially decomposed, and then placed in large square pine-tree boxes; a layer about 3 deep in the bottom of each box, covered with cold water, and a layer of hot stones put in, then a layer of small pieces of wood, another layer of fish, stones, and so on. The oil is skimmed from the surface of the water in the boxes. A vast quantity of oil is thus obtained. The candle-fish is an excellent article of winter food in a climate of which the winter is severe; and notwithstanding its excessive fatness, is of agreeable flavor. It has not yet become an article of economical value to the civilized inhabitants of North-western America, but seems very likely to do so, and to acquire very considerable commercial importance.

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**CANDLE-NUT**, *Aleurites triloba*, a tree of the natural order *euphorbiaceae* (q.v.), a native of the South sea islands, Madagascar, Molucca, Java, etc., which produces a heart-shaped nut with a very hard shell, and a kernel good to eat when roasted, although in a raw state it possesses in a slight degree some of the active properties so common in the *euphorbiaceae*, and is apt to cause purging and colic. It is about as large as a walnut. An excellent bland oil is procured from it, used both for food and as a lamp-oil. The inhabitants of the Society islands after slightly baking these nuts in an oven, and removing the shell, bore holes through the kernels, and string them on rushes, hanging them up in their houses, to be used for torches, which are made by inclosing four or five strings in a leaf of the screw-pine (*pandanus*). These torches are often used in fishing by night, and burn with much brilliancy. The lamp-black used in tattooing was obtained from the shell of the candle-nut. A gummy substance exudes from the candle-nut tree, which the Tahitians chew.

**CANDLESTICK**. The ordinary C. is so well known that no description is needed. The most important modern improvement in the C. is a contrivance for maintaining the candle at a uniform height, by means of a spring placed below the candle, and confined in the cylindrical body of the C.; this spring presses the candle upwards with sufficient force to drive it completely out, but for a collar at the top, against which the surface around the wick bears, and thus, as the candle melts, it yields to the pressure of the spring, and maintains a uniform height. The collar, when properly adjusted, also prevents the guttering to which composite candles are liable when exposed to currents of air or moved about.

**CANDOLLE**, ALPHONSE LOUIS PIERRE PYRAMUS DE, a noted Swiss botanist and son of the naturalist, Auguste de Candolle, born at Paris, October 27th, 1806. He was educated at Geneva where, at his father's desire, he studied law, receiving the degree of LL.D., in 1829, but ultimately abandoned the profession and pursued the study of botany, receiving, two years later, an honorary professorship at the Academy of Geneva, and upon his father's retiring, in 1835, he succeeded him in the professorship and direction of the botanical gardens. After retaining these offices eighteen years, he resigned, in 1851, upon being appointed correspondent of the French Institutes. A year later he was decorated with the Legion of Honor, and in 1874, upon the death of Professor Agassiz, was elected foreign member of the Institute in his place.

The most important of his many writings are the *Introduction à l'Étude de la Botanique* (1834-35, 2 vols.); *Géographie botanique raisonnée* (1855, 2 vols.); *Lois de la nomenclature botanique*; and he also edited a second edition of his father's *Théorie élémentaire de la botanique*, and completed the latter's most important work, *Prodromus Systematis Naturalis Regni Vegetabilis*. He d. in 1893.

**CANDY**. See CONFECTIONERY.

**CANDY**. See CEYLON.

**CANDYS** (Gr.), a loose gown, worn by the Medes and Persians over their other garments. It was made of woollen cloth, which was either purple or of some other brilliant color, and had wide sleeves. In the sculptures at Persepolis, nearly all the personages are represented as so attired. A gown of a very similar kind is still worn by Arabians, Turks, and other orientals.

**CANDY-SUGAR** is the popular name applied to ordinary sugar when procured in large crystals by the gradual and slow cooling of a concentrated solution of sugar. See SUGAR.

**CAN'DYTUFT**, *Iberis*, a genus of plants of the natural order *cruciferae*, distinguished by unequal petals, the largest being towards the circumference of the dense corymbs in which the flowers grow, and by an emarginate pouch with the valves keeled and winged, the cells one-seeded, and the cotyledons accumbent. The species are chiefly found in the countries surrounding the Mediterranean sea, and the name C. is supposed to be derived from that of the island of Candia, the name *Iberis* from Iberia (Spain). One species, *I. amara*, remarkable for its bitterness, is a doubtful native of England. Some species are slightly shrubby, some are herbaceous perennials, some annuals. Some are among the most familiar ornaments of our flower-gardens, as the annual white and purple C. (*I. umbellata*), the sweet-scented C. (*I. odorata*), and two slightly shrubby species, *I. sempervirens* and *I. semperflorens*, the latter of which, in favorable situations, continues to blossom throughout the whole winter, and pleases the eye at all seasons, both by the abundance and the perfect whiteness of its flowers.

**CANE**, a term sometimes indiscriminately applied to any small and smooth rod, of the thickness of a walking-stick or less; but more correctly limited to the stems of the smaller palms and the larger grasses. We thus speak of sugar C., bamboo C., etc., among the latter; whilst among the former, this name is particularly appropriated to the species of the genus *calamus*, also called rattan. To this genus belong the canes largely imported from the tropical regions of the east for making bottoms of chairs, couches, etc. See RATTAN.

**CANE**, or KEN, a river rising in Bundelcund, near lat. 23° 54' n., and long. 80° 18' e., and, after a n.e. course of 230 m., entering the Jumna in lat. 25° 47' n., and long. 80° 35' east. It is too rapid and rugged for navigation; and is remarkable for the matchless beauty of its pebbles.

**CANEA**, or **CANNA**, called *Khania* by the Greeks, is the chief commercial town of Candia or Crete, and is capital of a province. It is situated on the northern coast, and occupies the site of the ancient Cydonia. The present city is of Venetian origin, and dates from 1252 A.D., when a colony was sent from Venice to occupy it. The object of its foundation was to keep down the Greeks, who had been in arms, and at open war with their Italian lords, almost without intermission from the day when the Venetians first set foot on their shores. Venetian coats of arms are still observed over the doorways of some of the principal houses. C. is surrounded by a strong wall and deep ditch, both of which, however, are in a state of great dilapidation; it has a good but very shallow harbor. C. is the principal mart for Candian commerce, and exports to France and Italy, oil, soap, wax, etc. Several consuls are stationed here, and it is the residence of the Turkish governor of the province, and of the Greek bishop. Pop. 12,000, of whom two-thirds are native Greeks; the rest mainly Turks. The language spoken is modern Greek. The environs of C. are very beautiful. Sometimes called Candia (q. v.).

**CANE-BRAKE**, *Arundinaria macrosperma*, a large kind of reed or grass, indigenous to the warmer parts of the United States of North America. It grows in marshy situations. It is of a genus allied to the bamboo. The flowers are in panicles.

**CANE DELLA SCALA**, 1291-1299; known also as **CAN GRANDE**, "great dog," a acquirement of Venice who took Padua from the Guelphs. In 1318 he was appointed then stowed away in large French Chibelline forces, which brought upon him the pope's food in winter. Immense shoals of *Candies*, he was seized with illness while making a caught in moonlight nights, when they come to bedral of that city. His court was the may often be seen glittering with their multitudes. entertaining Dante, among other noiselessly amongst them, and catch them by means of a ratron in glowing terms, and of pine-wood from 6 to 8 ft. long, made round for about 2 ft.

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**CANGE, DU.** See **DUCANGE.**

**CANGIA'GI, OR CAMBIA'RO, LUIGI, 1527-85;** a Genoese painter, taught by his father. He gained celebrity at an early age, and, in 1583, was invited to Spain by Philip II. to assist in the decoration of the Escorial, in which he painted the ceiling of the choir, representing the "Assemblage of the Blessed," which is considered his best work. Among others of his works are the "Rape of the Sabine Women," the "Sleeping Cupid," and "Judith."

**CANICAT' TI, a t.** in Sicily, in the province of Girgenti, and 15 m. e.n.e. of the city of that name. It is situated on the banks of the Naro, is well built, and has sulphur mines. The inhabitants, about 22,000 in number, are principally engaged in agricultural pursuits.

**CANICULAR, CANICULAR DAYS, OR DOG-DAYS, CANICULAR YEAR.** Canicular was an old name of *Canis Minor* (q.v.); it was also used to denote *Sirius*, or the dog-star, the largest and brightest of all the stars, and which is situated in the mouth of *Canis Major* (q.v.). From the heliacal rising (q.v.) of this star (*Sirius*), the ancients reckoned their dog-days, or *dies caniculares*, which were 40 in number—20 before, and 20 after the rising of the star. The rising of the dog-star was in ignorance supposed to be the occasion of the extreme heat and the diseases incidental to these days. It was by mere accident that the rising of the star coincided with the hottest season of the year, in the times and countries of the old astronomers. The time of its rising depends on the latitude of the place, and is later and later every year in all latitudes, owing to precession. In time, the star will rise in the dead of winter. The canicular year was that known among the Egyptians and Ethiopians. It was computed from one rising of *Sirius* to the next, and consisted ordinarily of 865 days, and every fourth year of 866. This year was sometimes called the heliacal year. The reason for computing the year from the rising of *Sirius*, seems to have been that, at the time, the heliacal rising coincided with the greatest swelling of the Nile. See **CALENDAR.**

**CANIDÆ** (Lat. *canis*, a dog), a family of the digitigrade (q.v.) section of carnivorous mammalia, which, as now generally defined, is less extensive than the Linnæan genus *canis*, the hyenas being excluded from it, and referred to the family *viverridæ* (civets, ichneumons, etc.). Those families are, indeed, closely connected, and hyenas may be said to form a connecting-link between them, the dentition, however, making a nearer approach than in either of them to that of the cats or *felidæ*.—The C. have two flat tuberculous molar teeth or grinders on each side, behind the great carnivorous cheek-tooth—the last premolar—of the upper jaw, a dentition resembling that of the bear family, or *ursidæ*, to which they exhibit a further resemblance in their power of adapting themselves to the use of vegetable food. Their whole organization fits them to be less exclusively carnivorous than the feline tribe. They have generally three incisors or cutting teeth, with one large canine tooth, and four premolars on each side in each jaw, two true molars on each side in the upper jaw, and three in the lower. The true molars are adapted for crushing either bones or vegetable food. The last premolars in the upper jaw are remarkably large, and particularly adapted for cutting flesh. See **DOG, FENNEC, FOX, JACKAL, LYCAON, WOLF, etc.**

**CANI'NA, LUIGI, CAVALIERE, 1795-1856;** b. in Piedmont; an architect and archaeologist. He was professor of architecture at Turin, and superintended the excavation of Tusculum in 1839, and of the Applan Way in 1848. He wrote many works on architecture and archaeology, some of which were published in the most sumptuous manner by his patroness, the queen of Sardinia.

**CANINES, OR CANINE TEETH,** the four teeth, two in each jaw, which are pointed and stand between the incisors and the bicusps; sometimes called "eye teeth" or "stomach teeth." In lions, wolves, dogs, and other carnivora they are large and strong, for holding prey and tearing raw flesh.

**CANINI, MARCO ANTONIO, Italian publicist and poet, b. at Venice in 1822,** studied at the University of Padua, but became involved in political troubles and fled to Tuscany, where he published *Pius IX. of Italy*. He afterwards took part in the political disturbances of 1849, and left Italy, travelling in Greece and the East. In 1852 he published *Mente, fantasia e cuore*, a volume of poems. After many adventures he returned to Italy in 1859, and in 1862 was appointed political agent in the East by Rattazzi. In 1866 he joined the army of Garibaldi and afterward went to France, but in 1873 returned to Italy. In 1876 he agitated in behalf of the Servians and later took part in the Russian campaign as newspaper correspondent. His works embrace a wide variety of topics and among them may be mentioned *Giorgio il monaco a Leila; Sonetti; Odi saffiche; La questione dell' Epiro; La verità sulla questione degli Israeliti in Rumania; Amore e dolore; Etudes étymologiques.*

**CANISTUS, PETRUS, 1521-97;** a Dutch Jesuit, who took a prominent part in the council of Trent in 1545; was preacher to Ferdinand I., and the first ecclesiastical governor of the Jesuits in Germany. He established colleges of the order at Prague, Fribourg, Augsburg, and Dillingen. He was the author of two catechisms, the larger and the smaller, and was beatified in 1864.

**CANIS MAJOR, the Greater Dog,** a constellation of the southern hemisphere, below the feet of Orion. It contains *Sirius*, the brightest of all the stars, and its place may

be found by means of this star, which is on the continuation of the line through the belt of Orion. According to Flamsteed, it contains 31 stars.

**CANIS MINOR**, the *Lesser Dog*, is a constellation of the southern hemisphere. It is near Canis Major, and just below Gemini. Procyon, of the first magnitude, is its principal star, and lies in a direct line between Sirius and Pollux; so that the position of the constellation may be found by means of this star. According to Flamsteed, it contains in all 14 stars.

**CANISTER SHOT.** See CASE SHOT.

**CANKER**, a disease of plants, especially fatal to fruit-trees in many gardens. It is a kind of gangrene, usually beginning in the young shoots and branches, and gradually proceeding towards the trunk, killing the tree in the course of a few years. Wet subsoils seem in many cases to induce it, and it begins most readily in shoots that have been imperfectly ripened and injured by frost, or which have received some accidental wound. Those varieties of fruit-trees which have been long propagated by grafting and budding are most liable to it. It is sometimes cured by *heading down* the tree, and causing it to throw out new branches.

**CANKER**, a vague term applied to various diseases of the lower animals, characterized by their chronic nature, and consisting chiefly in ulceration, suppuration, and the development of fungoid excrescences in the parts affected.

**CANKER**, in the foot of the horse. This malady, believed by Gerlach, of Berlin, to be truly cancerous, is observed in two different forms: in the acute stage, when the malady is chiefly local; and in the chronic stage, when the constitution suffers, and all local remedies fail to restore a healthy function of the structures of the foot.

*Symptoms.*—It usually commences by discharge from the heels, or the cleft of the frog of the horse's foot. The horn becomes soft and disintegrated, the vascular structures beneath become inflamed, and the pain which the animal endures is intolerable. It is therefore very lame on one, two, or all feet, according to the number affected. Though there is no constitutional fever, the horse becomes emaciated, and unfit for work. During wet weather, and on damp soil, the symptoms increase in severity. The sore structures bleed on the least touch, and considerable fungoid granulations, commonly called proud flesh, form rapidly.

*Causes.*—This disease is occasionally hereditary, and it is most frequently seen in low-bred draught or coach horses. Dirt, cold, and wet favor the production of the disease, and there is always a tendency to relapse when once an animal has been affected.

*Treatment.*—Pare away detached portions of horn, and, in mild cases, sprinkle powdered acetate of copper over the sore; apply over this pledgets of tow, fixed over the foot by strips of iron or wood passed between shoe and foot. In severe cases, tar and nitric acid, creosote and turpentine, chloride of zinc paste, and other active caustics, have to be used for a time with the regular employment of pressure on the diseased surface. The animal requires to be treated constitutionally by periodical purgatives and alteratives. Good food, fresh air, and exercise often aid much in the treatment of the disease.

**CANKER-SORE**, in the human being, is developed chiefly among children in the form of ulceration of the mucous membrane of the mouth, commonly the result of indigestive derangement. In general it is only a local and temporary affliction, and may be removed by proper application of nitrate of silver, either solid or in a solution, or with borate of soda.

**CANKER WORM**, *Anisopteryx*, a genus of destructive insects of the order *lepidoptera* and family geometridæ. The female moths, from the eggs of which this worm comes, are wingless. In the spring they creep up the trunks of trees, on which they deposit their eggs. These soon produce the worms, which feed upon young leaves of fruit-trees and of nearly all cultivated trees. After about four weeks of feeding they creep down, or let themselves down by a web, and burrow in the ground, where they change to chrysalis, and remain until the following spring. Like other geometridæ, the worm has six legs forward and four stout prop legs behind. In consequence of their singular mode of locomotion they are often called measuring, or inch or span, or loop worms or geometers. As the female moth cannot fly, trees may be protected from this worm by surrounding their trunks with a hollow vessel filled with oil or thin tar, which prevents the ascent of the egg-laying moth; but in recent years the sparrows introduced from England have entirely subdued this worm in many districts that had been completely denuded of leaves almost every summer. This remedy, however, is worse than the disease. The English sparrow is not, in general, an insect-eating, but is a grain-eating bird; it is very pugnacious, and as prolific as the rabbit; it has driven away the native birds wherever it has gained a footing, and as there are many other insect leaf-eaters which it will not touch, and which no other birds are left to destroy, the trees are in nearly as great danger as before, while the grain-fields of farmers are beginning to suffer severely from the ravages of the sparrows.

**CANNA**, a plant of the order *marantacea*, a species of reed, the fruit of which is a hard black seed growing in a capsule. The starch of C. is sometimes used instead of arrow-root. It grows along the coast in the southern states, and has become a common ornamental plant in the north.

**CANNA**, one of the islands of the Hebrides, off the w. coast of Scotland, 7 m. s.w. of Skye, and 3 m. n.w. of Rum. It belongs to Argyllshire, and is 4½ m. long from e. to w., and 1 m. broad. The surface stands high above the sea, and consists of trap (clay-stone, porphyry, and trap conglomerate, with fragments of old red sandstone and bituminous wood), which has overflowed thin laminæ of coal and shale. The island has a hill of basalt, called Compass Hill, which reverses the magnetic needle. It has a very small population.

**CANNABINACEÆ**, a natural order of dicotyledonous plants, or, according to many, a suborder of *URTICACEÆ* (q.v.), differing from the proper *urticaceæ* chiefly in the suspended exalbuminous seed, and hooked or spiral embryo. But only two plants of the order or suborder are known, both of them valuable, *HEMP* (q.v.) and the *HOP* (q.v.).

**CANNABIS INDICA**. See *HEMP*.

**CANNÆ** (ancient *Cannæ*), a t. of Southern Italy, in the province of Bari, 8 m. w.s.w. of Barletta, not far from the mouth of the Ofanto, formerly the Aufidus. It is celebrated on account of the great victory here gained by Hannibal over the Romans in the summer of 216 B.C. Hannibal crossed the Aufidus at a ford, and attacked the Romans, who in a short time were almost annihilated by the terrible Numidian cavalry. Among those left on the field were Paulus Æmilius, the consul of the previous year; Minucius, the late master of the horse; and a vast number of Roman knights. The loss of the Romans is stated by Livy at 45,000 infantry and 8,000 cavalry. As Hannibal lost in the battle 8,000 men, he did not think it prudent to follow the advice of Maharbal, and advance rapidly on Rome. Twenty thousand Romans were made prisoners, partly on the field of battle and partly in the camp.

**CANNEL COAL**. See *COAL*.

**CANNES**, a seaport t. of France, in the department of Alpes-Maritimes, pleasantly situated on the Mediterranean, on the road to Nice. The district in which it is situated is picturesque and very fertile. Oranges, lemons, olives, almonds, figs, peaches, and grapes are extensively cultivated. Situated on an elevation that slopes toward the sea, it is sheltered from the northern winds by a range of hills. It is famed for its salubrity, which has induced a number of English families to make it a winter residence; and it has become one of the most fashionable resorts in France. Lord Brougham used to occupy a fine villa here, and his death occurred here in 1868. Latterly, the town has been much improved. It has fisheries of anchovies and sardines, and a trade in the produce of the district. After his escape from Elba, Bonaparte landed about a mile and a half to the e. of C., Mar. 1, 1815. Pop. '91, 19,983.

**CANNIBAL** (derived from a variety in the spelling of Caribs, the original inhabitants of the West India islands, who were reputed to be man-eaters, and some tribes of whom, having no *r* in their language, pronounced their name *Canib*), means, like the Greek word *anthropophagos*, which is often used instead of it, one who feeds on human flesh. The practice is often attributed by classical and early Christian writers to races whose practices they denounce as abominable; but the denunciation is often better evidence of the abhorrence of cannibalism by those making the accusation than of its practice by the accused. Homer makes Polyphemus eat men, but only as one of his other unnatural attributes as a monster. The early Christian writers frequently attributed cannibalism to the unconverted. St. Jerome gives his personal testimony to the practice, stating that when he was a little boy living in Gaul he beheld the Scots—a people of Britain—eating human flesh; and though there were plenty of cattle and sheep at their disposal, yet would they prefer a ham of the herdsman or a piece of female breast as a luxury. Statements in old authors still more absurd induced some thinkers to believe that cannibalism is unnatural, and to deny that it was ever practiced by human beings except under the pressure of starvation. The accurate observation of late travelers has, however, put it beyond doubt that cannibalism has been and is systematically practiced. Comte, as part of his system of positive philosophy, accepting of cannibalism as a condition of barbarism, maintains that the greatest step in human civilization was the invention of slavery, since it put an end to the victor eating the vanquished. The facts, however, which we possess, show that the people systematically addicted to human flesh are not the most degraded of the human race. For instance, in the Australian continent, where the larger animals are scarce, the people, who are of an extremely degraded type, feed on worms and herbs, and have only been known in casual and exceptional conditions to feed on human flesh. The New Zealanders, on the other hand, who are the most highly developed aboriginal race with which late European civilization has had to compete, were, down to a late period, systematic feeders on human flesh, despising the inefficient food which satisfied the natives of Australia. In Angus's *New Zealand Illustrated*, there is a picture of the country mansion of the accomplished chief Rangihæta, "one of the finest specimens," says the author, "of elaborately ornamented dwellings yet extant." Its name is Kai Tangata, which means, eat man; and it has been so called in pleasing memorial of the feasts held within its walls. It has been supposed that the reason why, among the Jews and several eastern nations, the eating of swine's flesh was forbidden as an unclean food, was its resemblance to human flesh, and the danger that persons accustomed to the one might not retain their abhorrence of the other. In the crusades, the Saracens charged their Christian enemies with eating unclean food, including flesh

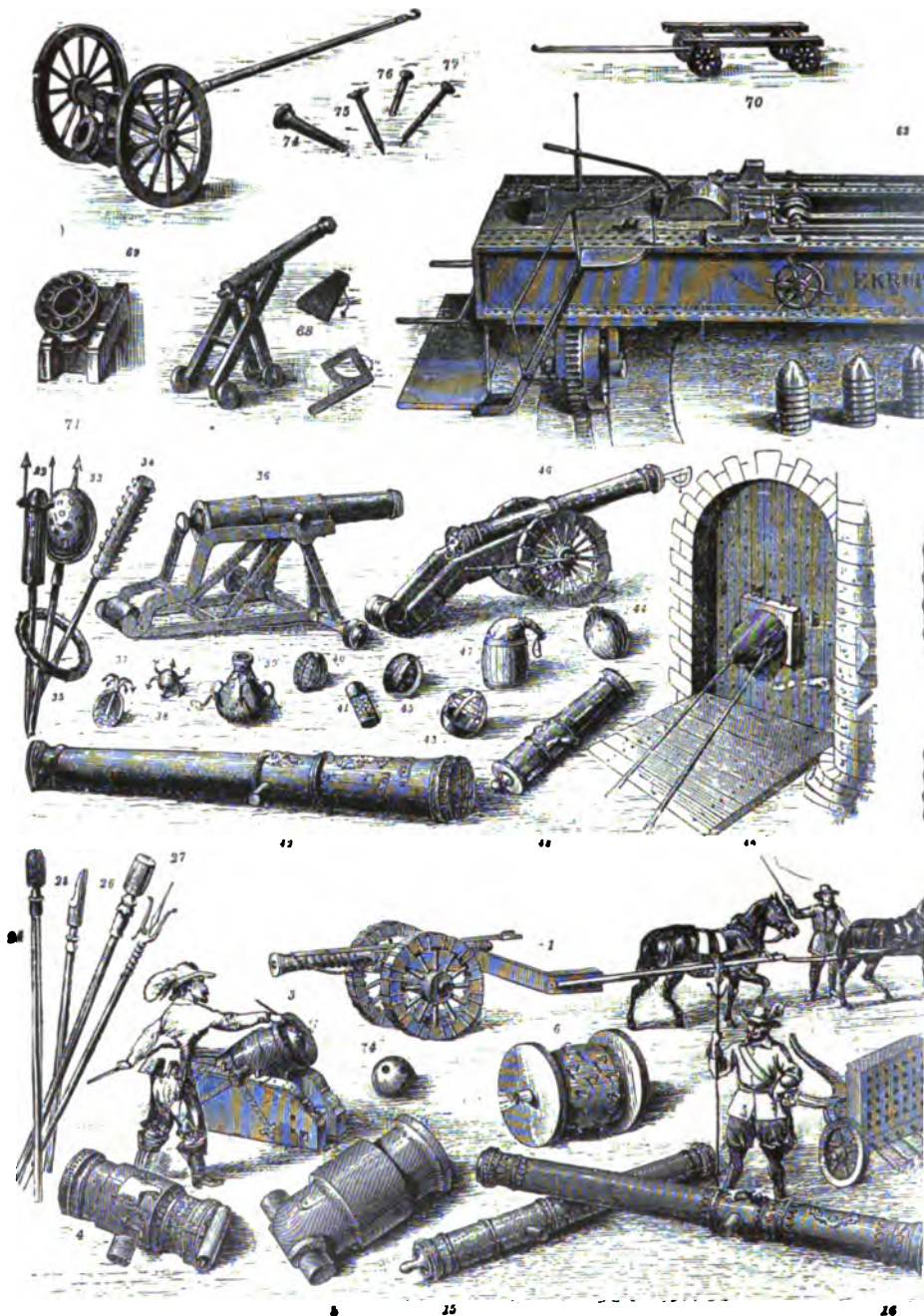
of men and of swine. In the old romance of Richard Cœur de Lion, he is represented, on recovering from sickness, as longing for a piece of pork; but that not being procurable, a piece of a Saracen's head was substituted for it, and pronounced by him to be infinitely more palatable. There have been many sad instances where people who naturally had a horror of such food, have been driven by starvation to eat human flesh—as in sieges and shipwrecks. Besides these instances, however, and the systematic cannibals, there is no doubt that people not otherwise habituated to the practice, have been excited by ferocity and revenge to eat, and with relish, the flesh of enemies. In many of the cannibal countries, only the flesh of enemies is consumed. As an instance that this is a natural development of ferocity in degraded natures, we may take the fate of the princess Lamballe in the French revolution, whose heart was plucked out by one of the savages of the mob, taken to a restaurant, and there cooked and eaten by him. The great Highland chief, sir Ewen Cameron of Lochiel, in a death-struggle with an English trooper, killed him by biting a piece out of his throat, and used to say it was the sweetest morsel he had ever tasted. See Andrée, *Die Anthropophagie* (Leip., 1887).

**CANNING, CHARLES JOHN**, Viscount, second son of the statesman George, was b. Dec., 1812. Educated at Eton and Oxford, he succeeded to the peerage as viscount C. on his mother's death in 1837, his elder brother, who was a captain in the navy, having been drowned at Madeira in 1828. In 1841, he became under-secretary of state for foreign affairs in sir Robert Peel's government, and afterwards commissioner of woods and forests. When lord Aberdeen came into office, he was made postmaster-general; and in the beginning of 1856, he succeeded lord Dalhousie as governor-general of India. His conduct during the awful crisis of the Indian mutiny was decried at the time by many as weak and pusillanimous; but the general opinion now, when all the circumstances of the case are better known, is that he acted with singular courage, moderation, and judiciousness. He died in London, 17th June, 1862.

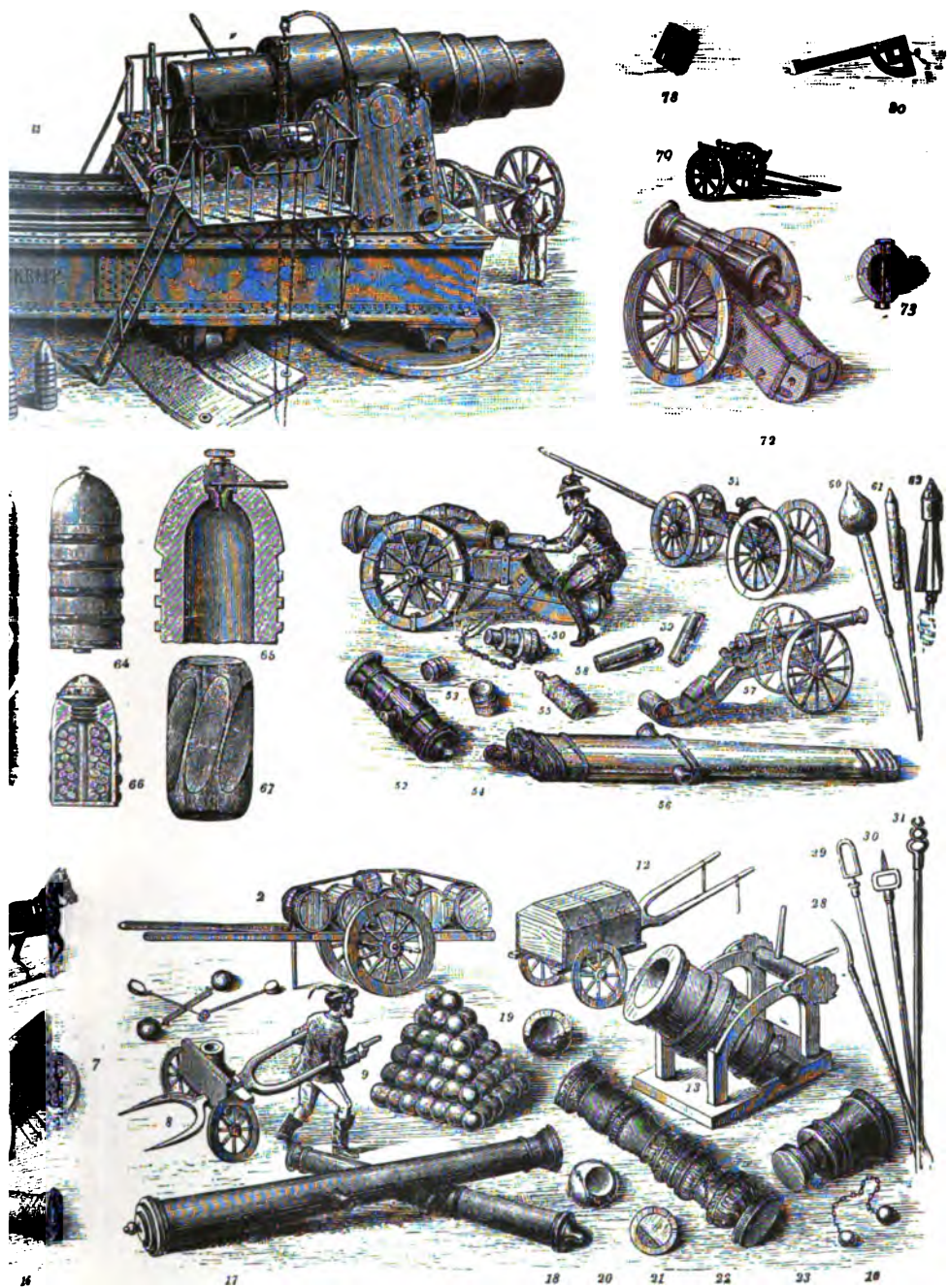
**CANNING, GEORGE**, a distinguished British statesman and orator, was b. in London, April 11, 1770. His father, who was descended from an ancient family, incurred the displeasure of his relatives for marrying beneath his station, and died in poverty when his son was only a year old. His mother (who for a subsistence tried the stage, with but little success, married an actor, and subsequently a linen-draper) lived to rejoice in the success and participate in the good-fortune of her boy, whose education was liberally provided by an uncle. G. was first educated at Eton, from which he passed, at the age of 17, to Christ's church college, Oxford, where he greatly distinguished himself, especially in classics. While here, he cultivated the friendship of the Hon. Charles Jenkinson (afterwards lord Liverpool), who was of considerable service to him in after-life. From Oxford he went to Lincoln's inn, but on the suggestion of Burke, as it is said, he soon relinquished the bar for a parliamentary career. He entered the house for Newport, Isle of Wight, in 1793, as the protégé and supporter of the minister, Pitt. In 1796, he was appointed an under-secretary of state. It was not, however, until 1798 that C. made a reputation as an orator and a statesman, by his speeches in favor of the abolition of the slave-trade, and against Mr. Tierney's motion regarding peace with the French directory, the latter of which, especially, was regarded as a masterpiece of eloquence, alike by the house and the country. In the debates on the habeas corpus suspension act, the union with Ireland, and other important questions, C. gave valuable assistance to the ministry, not only by his voice in parliament, but by his pen in a satirical paper, called the *Anti-Jacobin*, in which he especially lashed the "new philosophy," as it was called, promulgated by the French republicans. *The Knife Grinder* is one of the best known and happiest of his efforts in this line. In 1801, Pitt resigned office, and C. joined the opposition against the Addington ministry. When Pitt again became premier in 1804, C. was made treasurer of the navy, an office which he held until Pitt's death in 1806. His opposition to the short-lived Grenville ministry which succeeded, savored of the bitterness of party feeling, and his treatment of Fox in his last days, and of his memory after his death, was far from generous. When the Portland ministry was formed in 1807, C. was appointed minister for foreign affairs, a position for which he was specially qualified, and his dispatches, written at this time, are models of manliness and lucidity. In 1812, all his eloquence was enlisted in favor of Catholic emancipation. During the same year he was elected for Liverpool, for which he was again returned three successive times. In 1814, he went as ambassador to Lisbon, returned in 1816, and was made president of the board of control, and supported the Liverpool ministry in all their arbitrary and repressive measures until 1820, when he resigned, in consequence of the action of the government against queen Caroline. Nominated governor-general of India in 1822, he was on the eve of departure when the suicide of the marquis of Londonderry called him to the head of foreign affairs. In this capacity, C. conferred lasting benefits on his country. He infused a more liberal spirit into the cabinet, he asserted the independence of British politics against the diplomacy that would have entangled the nation with the Holy Alliance, and gave a new direction and impetus to commercial affairs by a gradual laying aside of the prohibitive system. He arranged the relations of Brazil and Portugal; drew the French cabinet into agreement with the British respecting Spanish American affairs; was the first to recognize the free states of Spanish America; promoted the treaty combining England, France, and Russia, for a settlement of the affairs of Greece,







**CANNON, ETC., *Antique*.**—1. French six-pound false culverin (1550). 2. French ammunition "Elephant," 1565). 5. German twenty-five pound mortar (1800). 6. Storming-key 10, 11. Chain and stem-shot. 12. Danish cartridge-carriage (1720). 13. German tw 16. German twenty-pound culverin (1550). 17. French culverin (1550). 18. German arde (1500). 23. Italian mortaro (1500). 24. Sponge. 25. Loading-shovel. 26. 32. Double-barbed spear. 33. Storming spear. 34. Storming club. 35. Storm 38. Anchor-ball. 39. Fire-jug. 40. Fire-ball. 41. Gun-carriage. 42. Forty-pou twelve-pound field-piece. 47. Powder-barrel. 48. Prussian twelve-pound field-pi 52. Prussian ten-pound howitzer (1812). 53. Cartridge. 54. Wad. 55. Bag-cartri cast-iron carriage (1713). 58. Ball-cartridge. 59. Shot-cartridge. 60. Prussian p gun. 64, 65. Percussion shells. 66. Prussian shrapnell-shell. 67. Whitworth' 71. French mortar with side-chambers (1680). 72. Prussian twenty-five pound ho (1818). 79. Trangree cart. 80. Quadrant.



munition cart (1560). 3. French twenty-pound mortar. 4. German eighteen-pound mortar (the  
 ig-key (1680). 7. German fire-shield (1620). 8. German little-chariot (1620). 9. Pile of balls.  
 an twenty-pound mortar with carriage. 14. Fire-bomb. 15. German sectional shield-piece (1680).  
 German falconet (1740). 19-21. Concentric, eccentric, and explosive bombs. 22. Italian bomb-  
 l. 26. Rammer. 27. Fuse. 28. Spike. 29. Swipec. 30. Charge-drawer. 31. Ball-extractor.  
 storming wreath. 36. Danish iron gun carriage for forts (1713). 37. Hot-shot with anchor.  
 y-pound cannon of Charles V. 43. Fire-cross. 44. Fire-ball. 45. Explosive-ball. 46. German  
 ld-piece (1812). 49. Petard. 50. German breech-loader (1550). 51. French field-piece (1750).  
 artifice. 56. German cannon with oval lumen (1680). 57. Danish three-pound field-piece, with  
 an p. d-rocket. 61. Rocket with side-staff. 62. Rocket without staff. 63. Krupp 1000-pound  
 rth' ll. 68. French mountain-piece (1680), and quadrants. 69. Drag. 70. Block-chassis.  
 lth' r. 73. Wooden mold for fire-balls. 74. Fusee. 75-77. Tin fusees. 78. French brake





and which was signed July 6, 1827; protected Portugal from Spanish invasion; contended earnestly for Catholic emancipation; and prepared the way for a repeal of the corn-laws. In Feb., 1827, a stroke of paralysis forced the earl of Liverpool to resign, and Mr. C. was called upon to form a new administration. His health, however, gave way, and he died Aug. 8. See Lord Dalling's *Historical Characters* (1867).

**CANNING, SIR STRATFORD.** See STRATFORD DE REDCLIFFE, Viscount.

**CANNON.** See MACHINE GUNS, ORDNANCE, ORDNANCE FABRICATION, RAPID-FIRE GUNS.

**CANNON**, a co. in central Tennessee; 280 sq. m.; pop. '90, 12,197, includ. colored. The surface is uneven, but the soil is generally fertile, producing grain, tobacco, etc. Co. seat, Woodbury.

**CANNON, GEORGE Q.**, b. Liverpool, Eng., in 1827; received a thorough education; one of the first settlers in the Great Salt Lake basin, now Utah territory; member of the legislative council of Utah, 1865, '66, '69, '70, '71, '72; delegate in congress from Utah for many years; influential Mormon leader; translated the *Book of Mormon* into the Hawaiian language.

**CANNON, JOSEPH G.**, b. N. Car., 1836; was state's atty. in Ill., 1861-68; was elected to congress as a Republican from Illinois in 1872; and re-elected for each succeeding term.

**CANNON FOUNDING.** See ORDNANCE FABRICATION.

**CANNSTATT**, a t. of Württemberg, beautifully situated on the Neckar, about 3 m. n.e. of Stuttgart. It owes its origin to the Romans, of whose presence there are still found many traces. It has numerous mineral springs. Pop. '90, 19,800.

**CANO, ALONSO**, an illustrious Spanish painter, the founder of the school of Granada, in which city he was born, Mar., 1601. He received his first instructions in the principles of art from his father, Miguel Cano, who was an architect; studied sculpture under J. Montanes, and painting under Pacheco and Juan de Castillo; and attained celebrity so early that, in 1638 or 1639, he was appointed court painter and architect to the king. He died at Granada in 1664 or 1667.

**CANOE AND CANOEING.** A canoe is a species of boat, made by hollowing and shaping the trunk of a tree; sometimes of skins stretched over whalebone, as used by the Esquimaux, and propelled by the double-bladed paddle, 7 feet long and 6 inches broad. Also from the bark of trees shaped and strengthened. The French for canoe we find to be *canot*, Spanish *canoa*, Italian *canoe*, all derived from the Latin *canna*. Often, however, the inhabitants of France give the following names to the canoe, *bateau*, *caïque*, *bid*, *navire*, *pirogue*, *chaloupe*, *nacelle* or *périssoir*; to the paddle, *pagaye*, and the paddler *pagayeur*. The English word "canoe" may be defined as a boat propelled by one or more paddles, used without a fixed fulcrum (prop or support) on the boat, and, therefore, invariably with the sitter facing toward the bow. Canoes are made of many different substances. In America, the most commonly used one is the birch-bark canoe, which is made in all sizes. Paper canoes are also in use, but are too light and cranky except for racing. Canoes of tin and of india-rubber have been used in England; but for general use canoes made from oak, cedar, birch, or pitch pine are the most durable. In having a canoe built, it is a matter of considerable moment that in certain portions of its framework it should be constructed for, and peculiarly adapted to, the particular person who is to use it. The length of the foot decides the height the canoe should be from keel to deck; the length of the legs the space required for the "well;" while the weight, of course, decides the displacement. The canoe has been popular in England for more than twenty years, merely, however, for short races on smooth waters. It was not until 1865 that one was especially designed for a long journey by water in seas, lakes, and rivers, and by railroads and carriages on land, and to be dragged over rough roads and through thick woods, or carried on men's shoulders from one stream to another, as is so frequently the case to-day, especially in America. Oak is the best wood that can be used, with the top streak of mahogany and the deck of fine cedar. Of these materials, the *Rob Roy* (Mr. Macgregor's famous boat) was made, and as her weight with all her fittings was only 71 lbs., it would be unreasonable to expect one lighter; indeed, for any one knocking about, lighter or flimsy canoes are utterly useless, and only increase the labor of paddling. The length over all should be 14 feet; beam, 26 inches; depth, from top of deck to bottom of keel, 12 inches, though towards the gunwale this is reduced to 8½ inches. The well should be 32 inches long and 20 broad, and protected by a combing of oak half an inch in length. If the canoe be intended for travelling purposes, the beam should be 6 inches abaft midship, so that when stores, provisions, sails, and so on, are stowed away forward it brings the craft to very nearly an even keel. The paddle is 7 feet long with 6 inches of breadth in the blade, and can be either double-bladed or single. Some canoes are arranged with rudders which are worked with the feet, in order to counterbalance the lateral swerving, but in this country these are very little used. The boards that compose the floor are about two feet long, and are fitted so that the knees just touch the combing while the heels are against the footboard on the keel, thus obviating the discomfort which would follow if one were obliged to keep the legs stretched out at full length. Sails are frequently used. The weight of an ordinary travelling canoe when complete is about 70 lbs. It will float, with its paddle and 10 lbs. of lug-

gage, in 5 inches of water. For racing over a short, straight, smooth course, the ordinary sculling skiff will be found superior to the canoe, but for long journeys or in strange rivers, or following unknown streams in rocky countries, or for rough usage, intricate navigation, frequent portage, or unexpected difficulties, the canoe is far superior and much more useful than the ordinary rowing boat. An average of forty miles a day can be made on lakes in a travelling canoe, unless contrary winds interfere. Canoes for fast racing are 20 feet long and 18 inches broad, and can attain a speed of about 8 miles an hour. The best material for a paddle is spruce-fir, as it combines lightness and durability. In 1866 the Royal Canoe Club was formed in England, with the Prince of Wales as Commodore, while about 500 members from various parts of the world have been elected. At the present writing (1891) the American Canoe Club numbers fully 5000 members. Many rivers have been explored in all parts of the world in canoes; some of the most important and interesting are the Kishon, the Jordan, the waters of Merom, in Syria, as well as the Lake Menzaleh, in the Delta of the Nile. Many rough and dangerous passages have been made in canoes; one member of the Royal Canoe Club crossed the English Channel from Dover to Boulogne, another from Boulogne to Dover, and a third the Irish Channel from Scotland to Ireland. There is, of course, danger in canoeing, and every one who decides to make canoeing a pastime should first learn how to swim. The sport is a most healthful one, and during the past few years has become very popular in America, where it can be enjoyed from May to September in the Eastern States and Canada, and nearly all the year round in the South. See *Canoe Travelling*, by W. Baden Powell; *Cruise in a Cockle Shell*, by A. H. Reed; *The Canoeist* (Royal Canoe Club); *A Thousand Miles in the Rob Roy Canoe*, *The Rob Roy on the Baltic*, and *The Rob Roy on the Jordan, Red Sea, Nile, and Gennesareth*, by Macgregor; *Watery Wanderings*, by Holding (1886). The *American Canoeist* represents the American Canoe Association. See CATAMARAN.

**CANON**, a word originally Greek, and signifying a measuring-rod (see CANOE—*ad inét.*), applied in various arts and sciences to what serves for a rule or standard, but particularly employed to designate collectively those books which constitute the Holy Scripture, and are accepted by Christians as a rule of faith. See BIBLE. In ecclesiastical language, the word *canon* signifies, besides, not only a church-precept, but also the decree of a universal council, which is held valid as law. See CANON LAW.

**CANON**, an ecclesiastical dignitary, so called as living under a rule, or as following the rule or canon of divine service. His office is of no great antiquity. According to Paschier, the name was not known before Charlemagne. This, however, is not precisely true, for the term C. was applied in the 4th c. to cenobites living under a common rule; but the office of C. is supposed to have been first instituted by Chrodegand or Chrodegang, bishop of Metz, in 768. It is at least certain that he was the author of the oldest canonical rule, which was simply an adaptation of the monastic rule (commonly but erroneously attributed to St. Augustine) to the priests and "clerks" specially attached to the service of a cathedral or other church. It enjoined on the canons manual labor, the practice of silence at certain times, confession twice a year, and other duties needless to specify. The canons formed the council of the bishop, and assisted him in the government of his diocese. They lived in a house called a *monastery*, slept in a common room, ate at the same table, and were originally supported out of the episcopal revenues. In 816, Louis le Débonnaire induced the council of Aix-la-Chapelle to draw up a general rule for the whole body of canons. Canons found their way not long afterwards into England, Scotland, and Ireland. Various reforms of C. were made in the 11th and beginning of the 12th century. Gradually, however, many began to emancipate themselves from the restrictions of monastic life, and to live independent of any rule, which is not at all surprising, for the canons were wont to keep apart from the "lower clergy," as they called parish priests and others who really labored to impart religious instruction. They were often of noble families, loved titles—at Lyon, they were called *counts*—and in general were men of the world rather than true churchmen. Some of these reformed or remodeled canons were called black canons, from wearing a black cassock; white canons, from wearing a white habit like the *Prémonstratenses* of Picardy in France. The class of *secular* canons, whose manner of life was not conventual, and who therefore escaped destruction in England when the monasteries were abolished by Henry VIII., probably originated in a tendency to relax the severity of rule enjoined on the regulars, which indeed was hardly less stringent than in the case of ordinary monks. Secular canons still exist in the Anglican church, and their duties—making allowance for the difference between the Roman Catholic and Protestant religions—are much the same in kind as they were before the reformation. See CATHEDRAL.

**CANON**, in music, a kind of fugue in which not merely a certain period or phrase is to be imitated or answered, but the whole of the first part with which the C. begins is imitated throughout by all the other parts. As in fugues, the melody of the part to be imitated is called the subject, and the others its reply. The C. is the highest degree of mechanical musical contrivance. The ancients spent more time in the construction and resolving of mere puzzling and unentertaining canons, than in the cultivation of good harmony and melody.

**CANON** (Sp. a "tube"), used in the western states and territories to designate a deep ravine, especially if worn down by running streams. Of late the word is often

spelled *canyon*. There are many cañons in the Rocky mountain region and further westward; but the greatest is the Grand Cañon of the Colorado, which is more than 300 m. long, with nearly perpendicular walls from 3,000 to 7,000 ft. high.

**CANON CITY**, city and co. seat of Fremont co., Col.; on the Arkansas river at the foot of the Rocky mountains, and on the Denver and Rio Grande railroad; 41 miles w. of Pueblo. There is unlimited water-power, and in the neighborhood are iron, silver, copper, coal, petroleum, marble, and limestone. There are also hot and cold medicinal springs. It has a public library, and is the seat of the State penitentiary. Pop. '90, 2825.

**CANONESS**, the name given to female members of certain orders in the Roman Catholic church, who seldom took monastic vows, but lived in common. The communities were favored by noblemen, who intrusted their daughters to them, but with the privilege to marry at any time.

**CANONICAL HOURS**, are the times fixed for divine service in the Catholic church, but no longer strictly adhered to. These have not always been the same, and it is not known when nor by whom they were settled—some say by popes Damasus, or Gelasius, or Gregory—but they are now fixed at seven; viz., matins and lauds, prime, tierce, sext, nones, vespers, and compline. These used to be observed as follows: Prime, tierce, sext, and nones, at the first, third, sixth, and ninth hours of the day, counting from six in the morning; vespers at the eleventh hour; compline, or completorium, as completing the services of the day, at midnight; and matins shortly after midnight. These hours were by the Anglo-Saxons called *uhtsang*, *primesang*, *undersang*, *middaysang*, *noonsang*, *evensang*, and *nightsang*. The first, two and the last formed the nocturnal, the remaining four the diurnal offices. The reasons given for the dividing the day into seven parts were—that in seven days the creation was completed, that seven times a day the just man falls, there are seven graces of the Holy Spirit, seven divisions of the Lord's prayer, seven ages of a man's life, etc. The hours had also each its mystical reference to certain sacred occurrences, such as the incidents at our Lord's birth and crucifixion. The word "hour," in C. H., is derived, as some have suggested, from *ora*, a prayer; but more probably from *hora*, an hour, and called canonical because according to the canon or rule of the church. The proper offices for the C. H. are to be found in the Breviary (q.v.).

**CANONICALS**, a term used to describe the proper ecclesiastical dress of the clergy. See **VESTMENTS**.

**CANONICAL VIRGINS**, young women of the early church who took vows of perpetual virginity, but were not gathered into communities. They were enrolled at their homes, where they continued to reside.

**CANONICUS**, a Narragansett Indian chief, 1565-1647; the constant friend of the early white colonists, and especially of Roger Williams, to whom he was strongly attached. It was from him that Williams obtained his title to the lands that now constitute Rhode Island.

**CANONICUT**, or **CONANICUT**, an island in Narragansett bay, about 8 m. long by 1 wide. It forms the town of Jamestown, R. I.; pop. '90, 707.

**CANONIZATION**, in the church of Rome, the act of the pope by which a deceased person is solemnly declared to be a saint. It had its origin in the practice of the early church, of inserting in the commemorative prayer of the eucharistic liturgy the roll of the names of those who had died as martyrs, or distinguished themselves as confessors of the faith. This record was entered in the diptychs of the church, and read in the so-called "canon" of the liturgy. Each bishop was at first accustomed to declare deceased persons to be saints. In the west, the exercise of this power came to be reserved to the popes, and the ceremonial itself was invested with much solemnity, and regarded as of very great importance. The first papal C. was accomplished by John XV. The popes have possessed the exclusive right since 1170. The right of *beatification* (q.v.) also belongs to them. When it is proposed to canonize a person of reputed sanctity, the pope declares his views in a consistory, and an inquiry is instituted as to the virtues and merits of the person proposed. The form of inquiry is that of a regular process at law, and an ecclesiastic is specially appointed to contend against the claims advanced, who receives the designation of *advocatus diaboli*; and on failure of satisfactory proof, the process is abandoned. When a favorable decision is pronounced, the ceremony of C. is performed in St. Peter's church with great pomp. The last C. was in 1863.

The Greek church also recognizes *canonization*. The right to perform the ceremony lies with the patriarch of Constantinople, but it has rarely occurred. An analogy to Christian canonization has been found in the apotheosis (q.v.) of the ancient Romans.

**CANON LAW** is a collection of ecclesiastical constitutions for the government and regulation of the Roman Catholic church, although many of its regulations have been admitted into the ecclesiastical system of the church of England, and still influence other Protestant bodies. It was compiled from the opinions of the ancient Latin fathers, the decrees of general councils, and the decretal epistles and bulls of the holy see. These, from a state of disorder and confusion, were gradually reduced into method, and may be briefly described in the following chronological order: 1. *Gratian's Decree*,

which was a collection of ordinances, in three books, commenced by Ivo, bishop of Chartres, 1114 A.D., and subsequently corrected and arranged by Gratian, a Benedictine monk, in the year 1150, after the manner of Justinian's *Pandects of the Roman Law*. This work comprises ecclesiastical legislation, as it may be called, from the time of Constantine the great, at the beginning of the 4th, to that of pope Alexander III., at the end of the 12th century. 2. The *Decretals*. They are a collection of canonical epistles, in five books, written by popes alone, or assisted by some cardinals, to determine any controversy, and first published about the year 1230, by Raimundus Barcinus. They lay down rules respecting the lives and conversation of the clergy, matrimony and divorces, inquisition of criminal matters, purgation, penance, excommunication, and other matters deemed to be within the cognizance of the ecclesiastical courts. To these five books of Gregory, Boniface VIII. added a sixth, published 1298 A.D., called *Sextus Decretalium*, or the *Sext*, which is itself divided into five books, and forms a supplement to the work of Barcinus, of which it follows the arrangement. The *Sext* consists of decisions promulgated after the pontificate of Gregory IX. Then there came the *Clementines*, which were constitutions of pope Clement V., published 1308 A.D. These decretals form the principal portion of the canon law. John Andreas, a celebrated canonist in the 14th c., wrote a commentary on them, which he entitled *Novella*, from a very beautiful daughter he had of that name, whom he bred a scholar; the father being a professor of law at Bologna, had instructed his daughter so well in it, that she assisted him in reading lectures to his scholars, and therefore, to perpetuate her memory, he gave that book the title of *Novella*. 3. The *Extravagants* of John XXII. and other later popes, by which term is meant to be denoted documents which transcend the limits of a particular collection of regulations. These books, viz., *Gratian's Decree*, the *Decretals*, and the *Extravagants*, together form the *Corpus Juris Canonici*, or great body of the C. L., as formerly received and administered by the church of Rome. There are, however, other publications of a later period, of more or less authority, but which do not appear to have received the formal sanction of the holy see.

This C. L., borrowing from the Roman civil law many of its principles and rules of proceeding, has at different times undergone careful revision and the most learned and scientific treatment at the hands of its professors, and was very generally received in those Christian states which acknowledge the supremacy of the pope; and it still gives ecclesiastical law more or less to Roman Catholic Christendom, although its provisions have in many countries been considerably modified by the *concordats* (q.v.) which the popes now and then find it expedient to enter into with Roman Catholic sovereigns and governments, whose municipal system does not admit of the application of the C. L. in its integrity. Indeed, the fact of its main object being to establish the supremacy of the ecclesiastical authority over the temporal power, is sufficient to explain why, in modern times, it is found to conflict with the views of public law and government, even in the case of the most absolute and despotic governments.

This ecclesiastical system, however, never obtained a firm footing in England, and the great lawyers and statesmen have always shown not only an unwillingness to defer to its authority, but even an aversion to its rule. There was, however, a kind of national C. L. in England, composed of *legative* and *provincial* constitutions, adapted to the particular necessities of the English church. The legative constitutions were ecclesiastical laws, enacted in national synods, held under the cardinals Otho and Othobon, legates from pope Gregory IX. and pope Clement IV., in the reign of king Henry III., about the years 1230 and 1268. The *provincial* constitutions are principally the decrees of provincial synods, held under divers archbishops of Canterbury, from Stephen Langton, in the reign of Henry III., to Henry Chicheley, in the reign of Henry V., and adopted also by the province of York in the reign of Henry VI. At the dawn of the reformation, in the reign of Henry VIII., it was enacted in parliament that a review should be had of the C. L.; and till such review should be made, all canons, constitutions, ordinances, and synodals provincial being then already made, and not repugnant to the law of the land or the king's prerogative, should still be used and executed. And as no such review has yet been perfected, upon this enactment now depends the authority of the C. L. in England, the limitations of which appear, upon the whole, to be as follows: that no canon contrary to the common or statute law, or the prerogative royal, is of any validity; that, subject to this condition, the canons made anterior to the parliamentary provision above mentioned, and adopted in our system (for there are some which have had no reception among us), are binding both on clergy and laity; but that canons made since that period, and having no sanction from the parliament, are, as regards the laity at least, of no force. See CANONS OF THE CHURCH OF ENGLAND.

In Scotland, Presbyterian though the ecclesiastical system of that country be, the old Roman C. L. still prevails to a certain extent. "So deep hath this canon law been rooted," observes lord Stair in his *Institutes of the Scotch Law*, "that even where the pope's authority is rejected, yet consideration must be had to these laws, not only as those by which church benefices have been erected and ordered, but as likewise containing many equitable and profitable laws, which, because of their weighty matter, and their being once received, may more fitly be retained than rejected." In two old Scotch acts of parliament, made in 1540 and 1551, the C. L. is used in conjunction with the Roman law to denote the common law of the country, the expression used being "the

common law, baith canon, civil, and statutes of the realme." See on the subject of this article generally the following authorities: Blackstone's *Commentaries*, by Kerr, vol. i., pp. 65 and 66; Stephen's *Commentaries*, 4th edition, vol. i. pp. 61 and 69—vol. ii. pp. 251, 256, 257, and 290—vol. iii. pp. 45, 48, and 421—and vol. iv. p. 243; Dr. Irving's *Study of the Civil Law*; and Phillimore on the *Influence of the Ecclesiastical Law*, etc., 1851. See also a discriminating article on this subject in Knight's *Political Dictionary*, 1845; and see Wharton's *Law Dictionary*, 2d edition, 1859. It will also be found carefully treated in Dr. Hook's *Church Dictionary*, 7th edition, 1854.

**CANONS, BOOK OF**, in Scottish ecclesiastical history, a code of canons or rules for the church of Scotland, prepared by the Scottish bishops, in obedience to the command of Charles I., revised by Laud, and confirmed by letters-patent under the great seal, 23d May, 1635. It tended much to increase the dissatisfaction prevalent throughout Scotland, and which soon broke out so violently. It not only required the most strict adherence to the liturgy, then not yet published, but enjoined many things concerning ceremonies in worship beyond what Laud had been able to introduce in the church of England; it also took away the powers of church-courts, and decreed the penalty of excommunication against all who should deny the government of the church by bishops to be scriptural, whilst its very first canon decreed that penalty against all who should deny the king's supremacy in ecclesiastical affairs.

**CANONSBURG**, a borough in Washington co., Penn.; on Chartier creek and the Pittsburg, Cincinnati, Chicago, and St. Louis railroad; 22 m. s.w. of Pittsburg; formerly the seat of Jefferson College and of the Pennsylvania reform school. It is in an oil, coal, and natural gas region, and contains iron and steel foundries, planing mills, Jefferson Academy, public library, national bank, and several newspapers. Pop. '90, 2118.

**CANONS OF THE CHURCH OF ENGLAND**, called constitutions and canons ecclesiastical, agreed upon, with the king's license, in the synod held at London in 1603-04. They were drawn up by the convocation, in order to give effect to the decisions of the conference held at Hampton; and are, for the most part, a digest of old canons, with some new ones added. They are 141 in number. They are the basis of the ecclesiastical law, as far as the clergy are concerned, but they are not binding upon the laity, except in so far as they are declaratory of the ancient canon law. There had been a previous body of canons drawn up in 1571, but these had not been sanctioned by the sovereign. In 1640, the convocation, which was then assembled with the parliament, prolonged its session beyond it, and passed a body of canons of a very arbitrary character; amongst other things, enjoining that on some Sunday in every quarter, every officiating minister should insist on the divine right of kings and their prerogatives, and enforce conformity to the rites of the church of England. In these canons, it was directed that the communion-table should be railed in, and be placed as in cathedrals, as is now done in all churches. These canons were abrogated by an act passed in the 13th year of Charles II. An account of these canons and those now in force may be found at length in Hook's *Church Directory*.—Every clergyman, when instituted to a benefice or licensed to a cure, promises **CANONICAL OBEDIENCE** to the bishop—i.e., the obedience due according to the canons of the church.

**CANO'PIC VASES** were vases used by the Egyptian priests to contain the viscera of embalmed bodies. They were arranged in a series of four—the first contained the stomach and larger intestines; the second, the smaller intestines; the third, the lungs and heart; the fourth, the liver and gall-bladder; and each had on its lid the head of the particular deity who was supposed to preside over the contents.

**CANO'PUS** or **CANO'BUS**, a city of ancient Egypt, from which the Canopic mouth of the Nile derived its name, was situated on the sea-coast, 15 m. e. of Alexandria. The Canopic mouth of the Nile appears to have been at an early period the only one into which foreign ships could enter. At C. the boundary-line between Asia and Africa was drawn by the ancient geographers. There was a temple of Hercules here, which was a secure sanctuary to all who fled to it; also one of Serapis, as several extant Greek inscriptions show. The inhabitants of C., a mixed Egypto-Hellenic people, were infamous, in the Greek and Roman times, for their profligacy. The city declined after the rise of Alexandria. Traces of its ruins are visible about 8 m. from Aboukir.

**CANO'PUS** is also the name of a very brilliant star of the southern hemisphere, in the constellation of the ship Argo, and, as Plutarch relates, received its name from Canopos, the pilot of Menelaus.

**CANO'PY** (Lat. *canopeum*; Gr. *kônôpeion*, from *kônôps*, gnat or mosquito). The derivation of this word throws a curious light on its original meaning, which probably was a mosquito curtain. The simplest form of C., in this its primitive sense, is that mentioned by Herodotus (ii. 96), who tells us that the fishermen on the Nile were in the habit of suspending the net with which they had fished during the day on an upright pole, from which it was expanded into the form of a tent, and served to protect them from the attacks of insects during the night. As it has been proved that insects will not pass through the meshes of a net, though wide enough to admit them, it is probable that this simple contrivance may have been quite effectual for the purpose for which it was used. Horace (Epod. ix. 9), and others of the ancient writers, mention gnat-curtains (*canopea*). Subsequently, the same term came to be used for the projecting covering and hangings of a bed, without reference to their original use, and latterly for any



projecting covering of a similar form, to whatever use it might be adapted, or whatever materials it might be formed. C. is thus used to signify the covering which is borne over the heads of kings and other persons of distinction, and still more frequently over the holy sacrament and the image of Christ, in processions in Roman Catholic countries. See BALDACHIN.

In Gothic architecture, C. is the term applied to those rich coverings which are frequently met with over niches and tombs, and sometimes over doors and windows. It belongs chiefly to the decorated and perpendicular styles, though it was not unknown much earlier. The C. consists of a roof, which may be supported on pillars all round, or may have one, or if in an angle *two*, sides attached to the wall, with dependent ornamental work representing drapery. The early English canopies are usually simple in form; those in French buildings of the same period being greatly more complicated and elaborate, as, for example, those in the cathedrals of Chartres and Bayeux. In the decorated style, the canopies were richly ornamented and very various in form. Some canopies are ornamented by pinnacles supporting smaller canopies, the whole terminating in a structure resembling a small turret, or crocketed spire. In the perpendicular style, though more varied in form, the canopies resemble those in the decorated. Most of the cathedrals and larger churches of England furnish examples of canopies, many of which are enumerated in Parker's *Glossary of Architecture*. For the use of canopies in Italian architecture, see BALDACHIN.

**CANOSA**, a t. of southern Italy, in the province of Bari, 13 m. s.w. of Barletta. It is situated on the declivity of a steep hill, upon the summit of which there are the remains of an old castle. It has a cathedral; and in an adjoining court is a tomb to Bohemond, prince of Antioch. It is chiefly remarkable, however, in connection with the discovered antiquities of ancient *Canusium* (one of the chief cities of the Apulians, the origin of which is obscured in the mists of mythology), on the site of whose citadel the modern town is said to stand. The antiquities consist of subterranean sepulchers, containing painted vases and funereal furniture of the most magnificent description in perfect order, painted busts, marble statues, etc. The objects were transferred to the museum at Naples. Pop. 16,000.

**CANOSA**, a t. of northern Italy, in the province of Reggio, about 12 m. s.w. of the city of Reggio, celebrated as the place where, in 1077, the emperor Henry IV. of Germany obtained absolution from pope Gregory VII., after three days' humiliation. From this circumstance the expression "to go to Canossa" has become proverbial, being used to denote a surrender to the claims of the church. When Bismarck inaugurated his *Culturkampf* (q.v.) he publicly boasted that he would never "go to Canossa," a boast which circumstances rendered it impossible for him to make good.

**CANOVA**, ANTONIO, the founder of a new school of Italian sculpture, was b. Nov. 1, 1757, at Possagno, a village in the Venetian territory. Having displayed in boyhood great talent in modeling, the artist gained the patronage of Giovanni Faliero, a Venetian senator, by whom he was sent to work under a sculptor at Bassano. His first imaginative performance, "Eurydice," half the size of life, was executed in his 17th year. After this he went to Venice, where his study of art properly began. In 1779, Faliero sent him to Rome, with an introduction to Cav. Zuliano, the Venetian ambassador, and one of the most illustrious patrons of art at this time in Italy. In Rome the first result of his studies appeared in the statue of "Apollo," which must be regarded as his earliest effort in ideal sculpture; but a far greater progress toward the pure style of the antique was evident in his next work, "Theseus with the Centaur." Nevertheless, C. did not rigorously adhere to the severe simplicity of the antique, but rather took pains to mitigate it by a peculiar grace and loveliness of his own, such as characterized his group of "Cupid and Psyche," which was produced soon after he had completed the monument of pope Clement XIV. This is apparent even in the colossal monument of Clement XIII. (erected in St. Peter's, 1792); though this work, on the whole, is a magnificent effort of genius, simple in style, and with nothing overwrought in the figures. Among his other works may be noticed a "Winged Cupid," "Venus and Adonis," a "Psyche holding a Butterfly," "Penitent Magdalen," in life-size; "Hercules hurling Lichas from the Rock," a colossal work, but not free from affectation; "Kreugas and Damoxenos" (two pugilists), "Palamedes," and "Perseus with the Head of the Medusa," a work which, more than all previous efforts, served to raise his fame. In 1802, C. was appointed by pope Pius VII. chief curator of all Roman works of art in the papal states; but was soon called away to Paris, to prepare the model of a colossal statue of Bonaparte.

After the fall of the French empire, C., in 1815, was employed by the Roman government as ambassador to recover the works of art which had been taken to Paris, and paid a visit to England. On his return to Rome, he was created marquis of Ischia, with a pension of 3000 scudi. This money he expended in the support of art and artists in Rome. C. died in Venice, 18th Oct., 1822. A marble statue was erected to his memory in the church de' Frati, 1827. Another monument to C. was erected in the library of the capitol, by order of Leo XII., in 1833.

It is universally allowed that to C. belongs the honor of having restored to sculpture the position which it had lost among the modern fine arts. After Michael Angelo Buonarrotti and Bernini, he was the third of epoch-making Italian sculptors. His delicate

execution and masterly treatment of marble are unrivaled, and even his faults—viz., his exaggerated nicety and carefulness, and his use of corrosives to produce fine finish—served to attract by the novel effects which they produced. The essential characteristic of all his works is sentiment—often verging, however, on sentimentalism.

During his leisure hours C. amused himself in painting, in which he attained such a degree of excellence in following the coloring of the Venetian masters, that his pictures have even deceived connoisseurs. In his private life, C. was a very amiable and benevolent man. Biographies of C. have been written by Missirini (4 vols., Prato, 1824), Cicognara (Venice, 1823), Rosini (Pisa, 1825), and D'Este (Florence, 1864).

**CÁNOVAS DEL CASTILLO**, ANTONIO, a leading Spanish statesman, born at Malaga, 1828. After completing a philosophical and legal education at Madrid, he entered upon a career of journalism, but was soon drawn thence into politics. In 1852 he represented his native city in the Cortés, and two years later was appointed *Chargé d'Affaires* at Rome, where he aided in preparing the Concordat between Spain and the Holy See. After being Director-General of the Administration from 1858 to 1861, and Under-Secretary of State in the latter year, he became, in 1864, Minister of the Interior in the Mon Ministry, and Minister of Finance and the Colonies in the O'Donnell Ministry the next year. He had the honor at this time of drawing up the law for abolition of the negro slave trade. He was one of the last to defend in the Cortés the Liberal principles he espoused, but was driven from power by Narvaez and González, and banished shortly before the revolution of 1868, in which he had no share.

In the ensuing provisional Cortés he combated the projects of a democratic constitution, and was one of the leaders of the movement which placed Alfonso XII. on the throne. Thereupon Señor Cánovas became President of the council and chief of the new cabinet—called the cabinet of conciliation—but withdrew in September before the demands of the extreme Conservative party. He was recalled, however, in December of the same year, and particularly charged with the direction of the first legislative elections under the new rule. From this time he remained Premier, until 1879, when Marshal Martínez Campos returned from Cuba, and upon Señor Cánovas' retiring, took his place, accepting as colleagues the former's principal associates. The latter, however, was in turn obliged to resign in December, being defeated upon certain free-trade measures. Señor Cánovas returned to power in 1881, but his Conservative cabinet was soon overthrown. He was premier in 1884-5, 1890-92, and again in 1895-97; but was assassinated in August of the latter year. He wrote numerous works on political science, and a leading *History of the House of Austria*. He was the recipient of numerous decorations, among them the *Red Eagle*, from the Emperor of Germany, and the *Golden Fleece*, from the King of Spain. In 1867 he was elected member of the Academy of Madrid.

**CANROBERT**, FRANÇOIS CERTAIN DE, Marshal of France, b. in 1809, studied in the military school of St. Cyr, and in 1828 entered the army. In 1835, he sailed for Algeria, and during the war in the province of Oran was made a capt. In the storming of Constantine, he was one of the first who entered the breach, when he received a wound in the leg. About the same time he had the decoration of the legion of honor conferred upon him. In 1846, he became lieut.col., and soon after col. In 1848, he had the command of an expedition against the tribes of the Bouaoun, whom he defeated at the pass of Djermia, and was victorious against the Kabyles. As gen. of brigade, in 1850 he led an expedition through the rocky country of Narah, and destroyed the Arab stronghold there. In Jan., 1853, he became a gen. of division. He had the command of the first division of the French army under Marshal St. Arnaud, sent to the Crimea in 1854; and at the battle of the Alma, was wounded in the breast and hand by the splinter of a shell. On the death of the marshal, C. took the chief command of the French army. In the war in Italy against the Austrians, in 1859, C. had the command of the third division of the French army; and at the battle of Magenta, June 4, his *corps d'armées* turned the left of the Austrians. In the great battle of Solferino, on the 24th of the same month, his division was hotly engaged, and lost 1000 men in killed and wounded. In 1860, he married Miss Macdonald, a Scotch lady. When war was declared by France against Prussia, in 1870, he was one of the generals in command at Woerth, where the French received a great check. C. was shut up in Metz with Bazaine, and became a prisoner in Germany. In 1876, he became a member of the French senate. He died Jan. 28, 1895.

**CANSO**, CAPE, the eastern extremity of Nova Scotia, and the southern boundary of the entrance of Chebucto or Chedabucto bay. It is in lat. 45° 17' n., and long. 61° west.—2. (Strait), a passage of 17 m. in length and  $2\frac{1}{2}$  in average breadth, connecting the inlet just mentioned with the gulf of St. Lawrence, so as to form an island of Cape Breton. Of the three channels between that inland sea and the open ocean, it is the one that is least frequently used by European vessels.

**CANTAB**, OR **CANTABRIGIAN** (Latin *Cantabrigiensis*), one who is either a student or a graduate of the university of Cambridge (England).

**CANTABILE**, in music, is found in several significations. In general, it is placed over passages of easy and flowing melody, as well in instrumental as vocal music. In songs, the melodies which lie chiefly in the middle region of the voice are marked C.: extreme tones of the voice have a peculiar *timbre* and character quite foreign to the cantabile. C. marked at the beginning of a piece means rather slow than quick. In the C. style the finest effects can be produced by the singer in swelling, sustained sound, the portamento, etc. C. is also called *cantilena*.

**CANTA'BRI**, a rude race of mountaineers in ancient Spain, were of Iberian origin, and lived in the district now known as Burgos, and on the coasts of the bay of Biscay, which derived from them its name, *Oceanus Cantabrigius*. The most important of their nine towns were Julobrica (near the source of the Ebro), Vellica, and Concana. The C. are described as like the Scythians and Thracians in hardihood and martial character, sleeping on the bare earth, enduring extreme pain without a murmur, and, like most savages, leaving agricultural toil to their women. Their bravery was evinced in the Cantabrian war, a six years' contest with the Romans, begun under Augustus, and concluded by Agrippa, 25-19 B.C. Tiberius afterwards stationed garrisons in the towns of the conquered C.; but some portion retreated into their fastnesses among the mountains, where they preserved their independence. They are supposed to be the ancestors of the Basques (q. v.).

**CANTA'BRIA**, a district in Spain on the s. coast of the bay of Biscay. The old geographers give the name to nearly the whole of the Biscayan coast, but it is now restricted to the province of Santander and the e. portion of Asturias; indeed, Cantabria is not now a geographical division.

**CANTABRIAN MOUNTAINS**, the general name of the several ranges of coast and boundary mountains, extending along the n. coast of Spain, from cape Finisterre, to the southern base of the w. Pyrenees, and so dividing the coast districts from the interior elevated plateau of Castile. The summits of the mountains here and there reach the lower line of the snow region, with a more gentle slope on the s. side, and forming plateau districts from 1600 to 2,000 ft. high on the n., where the slopes are steeper and intersected by coast rivers, leave in several parts only narrow stripes of flat coast-land, and running out into the sea form several bold promontories. The whole group of mountains is named variously by the people of various localities, and includes the Sierra de Aralar, Salvada, Anagña, Sejos, Albas, and Altuna—all more or less wild and romantic, but having those fertile and prosperous trading districts which distinguish the Basque Provinces and Asturias from the sterile central plateau of Spain.

**CANTACUZE'NUS**, JOHANNES, b. about 1800 at Constantinople; a statesman, general, and historian, and under Andronicus II. had principal charge of the government. When Andronicus died he was left regent, the successor being John Palæologus, then only nine years old. C. was suspected by the empress, fled from Constantinople, and got himself crowned in another place. Six years of civil war followed in which the rivals employed foreign mercenaries of every description, and nearly ruined the empire. C. formed an alliance with the sultan of Broussa, agreeing to send his daughter to his ally's harem and to permit the sultan to make slaves of the Greek subjects. In 1846, he entered Constantinople and became joint emperor with John, but retained full power during John's minority. He badly governed the almost ruined empire until 1854, when John made an easy success, and C. took refuge in a monastery, where he wrote a history of his life and times. He d. in 1883.

**CANTAL**, a central department of France, formed out of the s. portion of the old province of Auvergne. It has an area of 2,217 sq. m., and a pop. in '96 of 234,382. See AUVERGNE.

**CANTALIVER**, or CANTLIVER, a large bracket used in architecture for supporting cornices, balconies, and even stairs. Cantalivers are often highly ornamented.

**CANT'ALOUPE**, or MUSK-MELON, a well-known fruit, taking its name from Cantalupo in Italy. It is extensively cultivated in the United States, and is much esteemed for the table.

**CANTARINI**, SIMONE, also known as SIMONE DA PESARO or IL PESARESE, an Italian painter, was b. at Pesaro in 1612. He studied under Guido Reni at Bologna; but his intolerable arrogance made him numerous enemies, and in consequence he left the city, and went to Rome, where he won a high reputation, and was thought by many to excel even his master in the graceful finish of his brush. On his return to Bologna, he opened a school, but shortly after accepted an invitation from the duke of Mantua to visit that city. Here also his excessive self-esteem involved him in disagreeable relations with everybody, and at last he quarreled with the duke himself, on which he left for Verona, where he died in 1648, under suspicion either of having poisoned himself, or of having been poisoned by a Mantuan painter whom he had injured. C. was distinguished in modeling and flesh-coloring. A "Madonna upborne by Angels," and a head of Guido when old, in the gallery at Bologna; and others elsewhere, remain as proofs of his skill. His 87 etchings closely resemble the etchings of Guido Reni, and have, in several instances, been fraudulently sold with the mark of the master forged upon them.

**CANTA'TA**, in music, is a name given to a vocal composition; but it is so very indefinite, that it in no way shows in what respect such composition differs from any other. In Zedler of Halle's great *Lexicon*, the C. is defined as a "long vocal composition, the text of which is Italian," etc.; while in Sulzer's *Theorie der Schönen Künste*, it is said to be "a short piece of vocal music of a pathetic nature," etc. The C. is always more extended and wrought out than the simple song, and consists of different movements.

**CANTEEN.** In England the canteen is a refreshment house for the use of the soldiers, supplying them, though not compulsorily, with articles not regularly given out by the government. The selling of intoxicating liquors was prohibited in 1847. In the United States army the canteen system consists of a number of so called *post exchanges*. These are established and maintained at every post where practicable, under special regulations prepared by the War Department. They are intended to combine the features of a gymnasium, reading and recreation rooms, supplied with books and periodicals, billiard and pool tables, etc., co-operative stores and restaurants, including a lunch counter and a canteen for the sale of malt liquors and tobacco, their primary purpose being to supply the troops at reasonable prices with the articles of ordinary use, wear, and consumption, not supplied by the government, and to afford them means of rational recreation and amusement. The secondary purpose is, through exchange profits, to provide the means for improving the messes. The sale of spirits is prohibited. When an exchange is free from debt, the net profits are distributed (a) to the regimental fund, (b) for the improvement of the garrison, the post exchange or the post library, purchase of gymnasium appliances or athletic prizes, or (c) they may be divided among the organizations contributing to the exchange. Individual enlisted men may not become members. Members of the exchange are organizations, companies, and detachments, such as hospital or signal corps, or band. A council fixes the amount of assessment required to entitle an organization to membership. On June 30th, 1896, 73 exchanges were in operation in the United States army, representing a net value of \$192,795. Two-thirds of the exchanges have all the features enumerated above. The net profits at the end of 1895 were \$849,151, of which \$224,979 were distributed to the various commands as dividends on their investment.

**CANTEEN**, besides its application to a room or building, is a name also given to a vessel used by soldiers to contain whatever beverage may be obtainable on the march or in the field. It is sometimes of tin, sometimes of wood. In the regular army, the C. is a vessel, holding about three pints, sometimes painted blue, and inscribed with the number or designation of the regiment, battalion, and company to which the soldier belongs.

There is still another use of the word C., as a name for a leathern or wooden chest, divided into compartments, and containing the plate and table-equipage for a military officer when on active service.

**CANTÉMIR**, ANTIOCHUS, or CONSTANTINE DEMETRIUS, 1709-44; the youngest son of Demetrius Cantemir. He was a member of the St. Petersburg academy; wrote satires, and assisted in fixing versification and developing Russian poetry. At the age of 30 he was sent as minister to Great Britain, and in 1786 to France. He was a successful diplomatist, and was highly esteemed both at home and abroad. Besides translating into Russian the main works of Anacreon and Horace, he wrote odes, satires, and fables, and translated important works from French and Italian.

**CANTÉMIR**, DEMETRIUS, 1673-1723; a son of a Moldavian prince and heir to the throne, which, however, he never claimed, preferring to serve the Turks. In 1710, he was appointed prince to resist the expected invasion of Peter the Great. Convinced that ruin would come to the Turks, C. joined the czar and shared in the unfortunate campaign on the Pruth in 1711. When peace was made, Peter refused to surrender him to the Turks, and kept him employed in Russia, where he became a great favorite. His most important work was a history of the rise and fall of the Ottoman empire.

**CANTERBURY**, a municipal and parliamentary borough, a co. by itself, a cathedral city, and seat of the metropolitan see of all England, in East Kent, on the Stour, 56 m. e.s.e. of London, on the high-road from London to Dover. The distance from London by the South-eastern railway is 81 m.; by the London, Chatham, and Dover line, about 60. It stands on a flat between hills of moderate height. It has the aspect of an old town, many of the houses along the high street having gabled ends and projecting fronts. It has little manufacture or traffic. The chief trade is in corn, wool, and hops. Pop. '91, 22,700. Many are engaged in the hop-grounds. C. returns one member to parliament. It is noted for its brawn. Some remains of the walls (1½ m. in circuit and 20 ft. high) which formerly surrounded C., and one of the gates, still exist. Near the city wall is a large artificial mound, known as the Dane John (probably *Donjon*), and connected with this mound is a public garden, laid out in the end of the 18th c., from the top of which is a fine view of the country around.

**Cathedral.** When St. Augustine became archbishop of Canterbury, 597 A.D., he consecrated, under the name Christ's church, a church said to have been formerly used by Roman Christians. Cuthbert, the 11th archbishop, 740 A.D., added a church to the e. of this. In the course of ages, it received numerous additions, until it assumed its present magnificent form. Among those who helped to repair, enlarge, and rebuild it, were archbishops Odo (940 A.D.), Lanfranc (1070), and Anselm (1093). In 1174, the choir was destroyed by fire, and in order to the rebuilding of it, a number of French and English artificers were summoned. Among the former was a certain William of Sens, and to him, a man of real genius, the work was intrusted. The church was rich in relics: Plegemund had brought hither the body of the martyr Blasius from Rome; there were the relics of St. Wilfred, St. Dunstan, and St. Elfege; the murder of Thomas Becket (q. v.) had recently added a still more popular name to the list of martyrs. The

offerings at these shrines, especially the last, contributed greatly to defray the expenses of the magnificent work. William of Sens did not, however, live to see its completion. He was succeeded by another William, an Englishman, and to him we owe the completion of the existing unique and beautiful choir, terminated by the corona or circular chapel called Becket's crown. Gervasius, a monk, who witnessed the fire of 1174, and has left an account of it, tells us that the parts of Lanfranc's church which remained in his time were the nave, the central and western towers, the western transepts, and their eastern chapels. In the 14th c., the nave and transepts were transformed into the perpendicular style of that period. The central tower, called the Angel steeple, was carried up (1486-1504) to about double its original height, also in the perpendicular style; it is 234 ft. high, and 35 ft. in diameter. The n.w. tower was taken down in 1834; it was 118 ft. high, and divided into five stories. The Norman plinth still remains on each side of the nave in the side aisles, and portions of Norman ashlar may still be seen about the transepts outside the w. wall, and on the eastern piers of the great tower. The indiscriminate use of the "round" or "Norman," and the "pointed" or "early English" arch, is also a very striking feature in the eastern part of the building. The Lady Chapel, now called the Dean's Chapel, stands on the n. side of the church, and was built in 1468; the roof is a fan-vault. The n. transept is called the Martyrdom, for here took place the murder of Becket, on Tuesday, Dec. 29, 1170. Fifty years later, his remains were translated from the crypt to a shrine in the newly erected Trinity Chapel, eastward of the choir. About the year 1500, the yearly offerings at this shrine amounted to £4,000; but they had then declined much in value. A curious mosaic pavement still remains in front of the place where the shrine stood, and the stone steps which lead up to it are worn by the knees of countless pilgrims; but the shrine itself was demolished in 1538, and, according to tradition, the saint's remains were burned. In 1643, the building was further "purified," as it was called, by order of parliament. Still very many most interesting monuments remain—such as the tombs of Stephen Langton; that which is commonly, but wrongly, supposed to be the tomb of archbishop Theobald; with those of the black prince, of Henry IV., of archbishops Maphan, Peckham, Chicheley, Courtenay, Sudbury, Stratford, Kemp, Bouchier, Warham, and of cardinal Pole. The total exterior length of the cathedral is 545 ft., by 156 in breadth at the eastern transept. The crypt is of greater extent and loftier—owing to the choir being raised by numerous steps at the east end—than any other in England. Here in 1888 a stone coffin containing remains of a skeleton, supposed to be Becket's, was discovered and was reinterred. In 1561 this crypt was given up by Elizabeth to a congregation of French and Flemish Protestant refugees, and a French service is still held here. In 1872 the church narrowly escaped destruction for the fourth time by fire.

The archbishop of C. is primate of all England, metropolitan, and first peer of the realm. He ranks next to royalty, and crowns the sovereign. His ecclesiastical province includes all England, except the six northern counties. Among his privileges, he can confer degrees in divinity, law, medicine, and music. His seats are at Lambeth and Addington park. He is patron of 149 livings, and has an income of £15,000 a year. There are 14 old churches in C., mostly of rough flint, and containing fragments of still older structures. St. Martin's church stands on the site of one of the 7th c., and is partly built of ancient Roman brick and tile. Attached to the cathedral is a grammar school, remodeled by Henry VIII. Part of St. Augustine's Benedictine abbey still remains, with its fine gateway, near the cathedral. It occupied, with its precincts, 16 acres. The old buildings have lately received large modern additions, in order to fit them for the purposes of a missionary college in connection with the church of England. Another recent institution for education is the clergy orphan school, which occupies a conspicuous position on St. Thomas's hill, about a mile out of the city. The ruins of a Norman castle, 88 by 80 ft., the third in size in England, stands near the city wall. C. stood, in Roman times, at the union of two Roman roads from Dover and Lympe, the chief seaports of the Romans. C. was the capital of Kent, and the center from which England was Christianized. St. Augustine, the apostle of England, sent by Gregory I., was the first archbishop, and baptized king Ethelbert of Kent. C. was the Saxon *Cæter Cant*, city of Kent, and capital of the kingdom of Kent. The Danes, in the 9th, 10th, and 11th centuries, often ravaged and burned the city. Henry VIII. confiscated the treasures of the cathedral, and Edward VI. levied fresh exactions from it. The cathedral suffered much in the parliamentary struggles, but it has since been repaired.

**CANTERBURY**, a settlement of about 14,040 sq. m., on the e. coast of South Island, New Zealand, with Christchurch as its capital, and Lyttleton as its port. The district was settled in 1850 by the Canterbury association, a society of peers, bishops, and commoners interested in the colonization of New Zealand. It has a coast-line of about 200 m., and is well watered by numerous rivers. Coal (in abundance), iron-ore, fire-clays, and quartz have been discovered in the province, and several coal-mines are in operation. On the eastern side of the great range of hills are the far-famed Canterbury plains, the great sheep district of the colony—"3,000,000 of acres rolling back in gentle rise 40 m., to the foot of the central highlands, watered by 20 rivers, and spreading n. and s. further than the eye can reach." The natural pastures of C. are very fine; and to this circumstance is mainly due the rapid advance in prosperity of the country. Pop. '91, 128,471.

**CANTERBURY BELLS.** See CAMPANULA.

**CANTHARELLUS.** See FUNGI, EDIBLE.

**CANTHARIDINE.** See CANTHARIS.

**CANTHARIS** (Gr. a small beetle, plural *cantharides*), a genus of insects of the order *coleoptera*, section *heteromera*. See COLEOPTERA. It belongs to a family called *trachelides*, or necked beetles, the head being separated from the thorax by a distinct neck or pedicle, and forms the type of a subdivision of that family called *cantharidia*, many of the species of which possess blistering properties analogous to those of the common BLISTERING FLY, SPANISH FLY, or BLISTER BEETLE (*C. vesicatoria*). This insect, the best known and most important of the genus, is about an inch long; has a large heart-shaped head, rather broader than the thorax; thread-like antennae three times longer than the head; a nearly quadrangular thorax; and soft elytra (wing-covers) concealing the abdomen, and of equal breadth throughout. It is of a bright glossy green color. The common blistering fly is found in the s. of Europe, and in the s. of Siberia. It is abundant in Italy, Sicily, and Spain, in the s. of France, and in some parts of Germany and Russia. It is rare in England. The larva is not well known. The perfect insect feeds on the leaves of the ash, privet, lilac, elder, and honeysuckle; and rests on them during the night, the day being its time of activity. It is therefore taken by beating the branches of the trees in the morning or evening, when it is comparatively lethargic, a cloth being spread below to receive the insects as they fall. The gathering of *cantharides* takes place, in the s. of France, in the month of May. It requires great caution to prevent injury to those who engage in it, the insects emitting a volatile substance with a strong smell, which causes inflammation of the eyes and eyelids, convulsive sneezing, and irritation of the throat and bronchial tubes, nor can they be handled without danger of blistering. Those who collect them, therefore, generally wear gloves and veils. Unpleasant effects have been experienced from even sitting under trees on the leaves of which cantharides were numerous. Various methods are employed for killing cantharides when they have been taken; the cloths containing them are very generally immersed in hot vinegar and water, and they are afterwards carefully dried; sometimes they are killed by the vapor of vinegar, and sometimes by oil of turpentine. Unless kept with great care, they soon begin to lose their active properties, although, in stoppered bottles, they remain fit for use for years. They are very liable to be injured by mites, and afford a favorite food also to a kind of moth and to some other insects. They are imported into America from the s. of Europe, and also from St. Petersburg. See *illus.*, BUTTERFLIES.

The active principle of the blistering flies is *cantharidine*, which possesses such powerful blistering properties, that  $\frac{1}{10}$  of a grain placed on the lip rapidly causes the rise of small blisters. Administered internally, blistering flies cause heat in the throat, stomach, intestines, respiratory organs, etc.; and if in large doses, they give rise to inflammation of a serious nature, and sufficient to cause death. Externally, they are employed as a *blistering agent*. There are various medicinal preparations of blistering flies, such as *vinegar of cantharides*, obtained by macerating blistering flies in acetic acid; *tincture of cantharides*, procured by digesting blistering flies in proof-spirit, etc.; but that most commonly employed is *plaster of cantharides* or *blistering plaster*, obtained by mixing equal parts of blistering flies, yellow wax, resin, and lard. See BLISTER.

**CANTICLES**, a word which literally signifies songs, but which is specially applied to a canonical book of the Old Testament, called in Hebrew *The Song of Songs*—i.e., the most beautiful song. The author is commonly supposed to be Solomon, and in the rich luxurious splendor of its coloring, it admirably harmonizes with the "golden time" of that magnificent monarch. The theme which it celebrates is love; but what kind of love, whether earthly or spiritual, is a question that has perplexed Biblical critics. The oldest interpretations are allegorical, and are either political or religious. The former of these, considered C. as the symbolical expression of a deep longing for the reunion of the kingdoms of Judah and Israel; the latter, of the love of God for his chosen people, the Jews. The religious interpretation passed over from Judaism to Christianity, and assumed a new aspect in consequence. Origen found the beloved bridegroom in Christ, and the bride in the church or the believing soul. Only among the theologians of the Syrian school do we find an effort made to adhere to more intelligible principles of interpretation, but the "mystical view" obtained the upper hand, and has continued to be the predominant view of the poem amongst orthodox theologians. For a while an attempt was made to distinguish between a primary and a secondary sense, both more or less directly present to the mind of the author; but modern scholarship in the main contents itself with endeavoring to fix the primary or literal meaning. Nor is this an easy task. Some commentators hold, for example, that C. is an anthology of detached idyls; others argue that it is a dramatic unity composed of connected parts. Ewald has done much to establish the latter view. Ewald's followers hold that the poem was written about the middle of the 10th c. B.C. in the northern kingdom of Israel, and conceived in a spirit of hostility against the luxurious court of Zion. Solomon, the type of a sensual monarch, has carried off to his harem a northern shepherd maiden, who in the poem appears surrounded by the ladies of his court. The king fails even by the proffer of honorable espousals to overcome the maiden's fervent attachment to her shepherd lover

in the north country, and wholly abashed, ceases to press his suit. Finally, true and chaste love triumphs in the union of the peasant lovers.

**CANTING HERALDRY.** Allusive or canting, or punning arms, are those in which the charges suggest or play upon the name or title of the bearers, as the martlets (Old Fr. *arondel*, young swallow,) borne by the duke of Arundel, or the device of a broken spear for Brakspeare, or the mottoes, *Ver non semper vires* for the Vernons, and *Festina lente* for the Onslow.

**CANTIRE, or KINTYRE** (Gaelic, headland), a long narrow peninsula of Argyleshire, running n. and s. between Arran isle and the Atlantic, and united at the n. end with the mainland of Scotland, by the isthmus of Tarbet, a mile broad between e. loch Tarbet, a small loch or bay of loch Fyne, and w. loch Tarbet. It is 40 m. long.

**CANTILEVER BRIDGE**, a term borrowed from architecture—cantilever meaning a bracket used to support a balcony. There are two brackets in this kind of bridge, each resting on a pier, the outer ends of the brackets projecting over the water and sustaining a central span. There are four pieces of masonry; and on these are balanced two beams, resting upon the inner piers, the shore ends of the beams being fastened to the two extreme piers; while another span rests upon their outer ends. For bridges with long spans the cantilever system is thought to be the most economical, as less material is needed than in other kinds, and very little scaffolding is required. The central span may contract or expand without danger. As one end of the central span is fastened to one of the brackets, and the other placed on rollers, the deflection from the horizontal, as compared with the suspension bridge, is very small. The principle of the C. B. was undoubtedly known to the ancients. The first plan designed in this country was by Charles McDonald, in 1875, for a proposed bridge over the East river at Blackwell's island. The first C. B. built in this country, and the first of any magnitude in the world, was the new structure over the Niagara river in 1883. There is a large C. B. over the Firth of Forth; one across the Ohio river, connecting Louisville and New Albany, and one across the Hudson at Poughkeepsie. See **BRIDGE**.

**CANTON.** In heraldry, the C. occupies a corner of the shield, either dexter or sinister, and in size is the third of the chief. It is one of the nine honorable ordinaries, "and of great esteem."

**CANTON** (from the Fr. *canton*, a corner, a district; Ger. *kante*, a point, corner, border; allied to Eng. *canile*) signifies in geography a division of territory, constituting a separate government or state, as in Switzerland. In France, C. is a subdivision of an arrondissement.

**CANTON**, a city in Fulton co., Ill., on the Chicago, Burlington and Quincy, and the Toledo, Peoria and Warsaw railroads; 185 m. from Chicago, and 28 m. from Quincy. It is in a coal mining region, and has foundries, tile, brick, and marble works, agricultural implement works, cigar factories, public library, national banks, and several newspapers. Pop. '90, 5604.

**CANTON**, a town in Norfolk co., Mass., on the New York, New Haven, and Hartford railroad; 14 miles s.w. of Boston. It contains several villages, and has national and savings banks, public library, electric lights, churches, high school, and manufactories of copper, machinery, iron, woolen, sewing-silk, and cotton goods. Pop. '90, 4538.

**CANTON**, a town in Lewis co., Mo., on the Chicago, Burlington, and Quincy railroad, is advantageously situated on the Mississippi River, 200 m. above St. Louis, and 22 m. below Keokuk. It is a prominent shipping place, has a number of manufactories, and is the seat of Christian University, an educational institution under the charge of the Christian denomination. Pop. '90, 2241.

**CANTON**, a village and co. seat of St. Lawrence co., N. Y., on Grass River and the Rome, Watertown and Ogdensburg railroad; 60 m. n.e. of Watertown. It has a courthouse, almshouse, St. Lawrence University, and several churches. There is abundant water-power, used in the manufacture of lumber, flour, etc. Pop. '90, 2580.

**CANTON**, a city and co. seat of Stark co., O., on Nimishillen Creek, and on the Cleveland, Canton and Southern and other railroads, 60 miles s. of Cleveland. It is in a fine wheat-growing district, and coal, limestone, and clay for pottery and brick are found in the vicinity. It contains a fine post-office, churches, a U. S. signal service station, a high school, a public library, opera houses, electric railroads, etc. Its manufactures, which employ a capital of \$11,587,406. include iron bridges, mowing-machines, steel, cutlery, stoves, safes, woolens, and presses; and besides these articles large amounts of grain and coal are exported. In 1896, C. had 193 industries, manufacturing 6000 specific articles. There are several banks and newspapers. Population, 1860, 4041; 1880, 12,258; 1890, 20,189; est. '90, 40,492.

**CANTON**, a large commercial city and port in the s. of China, and capital of the province of Kwang-tung (of which the name C. is merely a corruption). It is situated in lat. 23° 7' 10" n., and long. 113° 14' 30" e., on the n. side of the Chookeang, or Pearl river, in a rich alluvial plain, 32 m. from the sea. The river (the entrance to which is known by the name of the Boca Tigris, a Portuguese translation of the Chinese *Hu-mun* ("Tiger's Mouth"), is very picturesque. The city is surrounded by a brick rampart 6 m.

in circumference, and entered by 12 gates, to each of which a guard-house is attached. It forms an irregular square, and is divided by a wall into the n. and s., or old and new city. The former is inhabited by the Tartar population, the latter by Chinese; and between the two, communication is maintained by four gates in the separating wall. The suburbs are very extensive, and in one of these, facing the river, stood the European factories or *hongs*. Most of the streets of C. are crooked and labyrinthine beyond description, but there are a small number of straight thoroughfares which make it easy enough for a stranger to find his way. As a rule, a tolerably straight street leads from the water-side to each gate of the city on the southern front, and is more or less prolonged through the interior. Many of the streets are devoted to distinct trades; thus, there is "Carpenter" street, "Apothecary" street, etc. The Joss-houses, chiefly Buddhist temples, are said to be 124 in number. The largest of these, on Honam island, covers seven acres, and has 175 priests attached. It is called *Has Ohwang See*, or "the temple of the ocean banner." Another famous structure is "the temple of the five hundred gods," situated in the western suburbs. There are also several many-storied towers or pagodas, a Mohammedan mosque, founded about A.D. 850 by the Arabian voyagers, who then were accustomed to visit C., a foundling-hospital, an English and an American missionary hospital. Streets of wooden houses were formerly to be seen on the river-side, but these were swept away during the late quarrel with Yeh; and one large site that they occupied was walled in for the purpose of erecting new foreign factories, the old ones having been totally destroyed by fire. A very remarkable example of life upon the water is the boat-town of Canton. The total population of the city has been vaguely estimated at 2,000,000. The climate of C. may be pronounced healthy; though the heat from June to Sept. is oppressive, and the thermometer sometimes, though rarely, stands at 100° in the shade. In ordinary years, the winter minimum is 42°, and the summer maximum 96°. The n.e. monsoon commences in Oct., and is the prevailing wind till Mar., when the s.w. monsoon sets in. Its average temperature is 70½° F., and the annual fall of rain 70.625 inches. The Cantonese are notorious for their turbulence and hatred of foreigners, and the European factories have more than once been attacked by infuriated mobs, who were only kept at bay by force of arms. This hostility may, however, be greatly due to the baneful influence of those in power; for here the government of the mandarins of the present Manchu Tartar dynasty appears to have reached its maximum of corruption and barbarity, and was fitly represented by the notorious Yeh, late governor-general of Kwang-tung and Kwang-se. The author of *Twelve Years in China* gives us some startling facts illustrative of mandarinic rule in this part of China. After the defeat of the Triad rebels, who besieged C. in 1844-45, it is estimated that 1,000,000 of people perished in the province.

The admirable situation of C. for conducting traffic explains how, from an early period, it was a favorite port with foreign merchants. The Arabs, as has been said, made regular voyages hither as early as the 9th century. The Portuguese found their way to it in the 16th c., and were followed by the Dutch a hundred years later. These in turn were overtaken and supplanted by the English before the close of the 17th c., and an immense trade was carried on by the agents of the East India company. Their monopoly ceased on the 22d April, 1834. Since that date the proceedings of the C. government officers have originated two wars with the British. The city was captured by the allied French and English forces Dec., 1857, and continued to be garrisoned by them till Oct., 1861. See CHINA. Until 1842 Canton was the only port at which foreign shipping was permitted to enter by the Chinese government. After the treaty of Nankin (signed Aug. 29, 1842), C. was known as one of the five ports; Amoy, Foochow, Ningpo, and Shanghai having also been thrown open to foreign commerce.

Foreign commerce, however, is still hampered in many ways in C. The lekin duties press most heavily on foreign merchants; ocean steamers have been compelled to discharge their cargo at Whampoa; and the general insecurity of property renders it necessary that every shop which contains anything of value should be barricaded at dusk, so that it could stand a siege; at sunset business must stop.

The chief exports from C. are tea, silk, matting, fire-crackers, etc.; the chief imports, cotton, woolen, and metal goods, food stuffs, opium, kerosene, etc. The harbor is filled with vessels and rafts. The greater part of the foreign shipping is in the hands of the British. It is one of the chief ports for foreign trade in China, surpassed, perhaps, only by Shanghai; but the opening of the northern ports has diverted much of the trade with C., especially that in tea.

CANTON, JOHN, 1718-72; an English natural philosopher, who made valuable discoveries in the then new science of electricity. For constructing artificial magnets he was honored with the membership and a gold medal of the royal society, and in 1751 he became one of the council of the society. He was the first person in England to verify Franklin's theory of the identity of lightning and electricity, having, in 1752, obtained fire from the clouds during a thunder-storm. He and Franklin almost simultaneously discovered that some clouds were charged with positive and others with negative electricity, a circumstance that made them warm personal friends. C. opposed the theory then generally accepted that water was incompressible.



**CANTONMENTS**, in the general operations of European armies, are temporary resting-places. Many circumstances, especially the state of the weather and the supply of food, influence a gen. in determining whether to go into C. or to encamp, in the intervals between active operations; or he may take the former course during an armistice. The quartermaster-gen. previously examines the district, and determines how many men and horses to place in each village; arrangements are also made for a main-guard, cavalry pickets, alarm-posts, road-barricades, lines of sentries, mounted orderlies, etc., to guard against a sudden surprise from the enemy. In C. the men are not generally under canvas, as described in **CAMP**.

In India, C. are *permanent* places, regular military towns, distinct and at some little distances from the principal cities. If on a large scale, such a cantonment contains barracks for European cavalry, infantry, and artillery; rows of bungalows or houses, each inclosed in a garden, for the officers; rows of huts for the native soldiery; magazines and parade-grounds; public offices and buildings of various kinds; and a bazaar for the accommodation of the native troops. During the revolt in 1857-58, most of the outbreaks began in the cantonments. It was in the cantonment outside Cawnpore that Nana Sahib commenced his treachery.

**CANTONNÉE**, in heraldry. When a cross is placed between four other objects, e.g., scallop shells, it is said to be cantonnée.

**CANTOR**. See **PRECENTOR**.

**CANTU**, CESARE, one of the best of modern Italian authors, was b. Sept. 5, 1805, at Brescia, in northern Italy, and was educated at Sondrio, where he was appointed professor of *belles-lettres*. Having been imprisoned for the offense of expressing liberal tendencies in a historical work on Lombardy, C. spent his leisure hours in describing the sorrows of a prisoner in the form of a historical romance, *Margherita Pusterla* (Florence, 1845). Cantu also wrote several religious hymns and songs, which have become popular; but his great work is the *Storia Universale* (35 vols., Turin, 1837-42). His *History of Italian Literature* appeared in 1851; *History of the Last Hundred Years* (1852); *History of the Italians* (1859); and *Milano, Storia del Popolo e del Popolo* (1871). He died in 1895.

**CANTURIO**, or **CANTU'**, a t. in northern Italy, 5 m. s.e. of Como. It is situated in the midst of a rich district, has a church with an elegant tower, which served as a beacon during the middle ages, and manufactures of iron-wares. Pop. 8000.

**CANUCK** (also **CANNUCK**, **CUNNICK**) is a name applied in the U. S. to any Canadian, while the English Canadians use it to denote a Canadian of French birth. According to Norton's *Political Americanisms*, it was first applied by the French to the English, and is a corruption of Connaught. Some scholars, however, believe it to be of Indian origin.

**CANUN**, a Turkish musical instrument, strung with gut-strings; is played on by the fingers, on which are thimbles of tortoise-shell, pointed with pieces of cocoa-nut, forming plectra for striking the strings with. The C. is a favorite instrument with the ladies in seraglios, many of whom produce very pleasant music and harmony on it.

**CANUTE**, or **CNUT**, succeeded to the rulership of the Danes in England on the death of his father, Swein or Sweyn, and was by them proclaimed king of England. On the death of Ethelred, he shared the sovereignty with Edmund Ironside, who ruled over the s., while C. was monarch over the n. of England. The sudden decease or assassination of Edmund made C. sole ruler in 1017, and he continued to reign until his death, in 1035 or 1036. His rule was marked at first by cruelty, but when all who were likely to interfere with his power had been disposed of, he exhibited great mildness and justice, combined with talent and judgment. The Anglo-Saxons, whose complete subjugation he had effected, did not feel their chains: they had experienced no such good government since the time of Alfred and Athelstane. He was easily accessible to all his subjects; and won the hearts of the people by his love song and ballad, and his liberal patronage of gleemen. One verse of an English song written by C. is still extant. As soon as English affairs were settled, C. superseded his brother Harold as king of Denmark; and in 1028 he extended his dominion over Norway—becoming thus one of the most powerful princes of Europe. In his latter years he was devout.

**CANVAS**, regarded from an artist's point of view, is the principal material upon which oil-paintings are made. Two kinds are prepared for this purpose, of which the best is called *ticking*. Before it is put into the artist's hands, it is usually *primed*, or grounded (see **GROUND**) of a neutral gray, or other tint, as he may direct. Certain sizes of C. being in greater request than others, are kept ready stretched on frames. Those used for portraits are known by the names of *kit-cat*, which measures 28 or 29 in. by 36: *three-quarters*, 25 by 30 in.; *half-length*, 40 by 50; *Bishop's half-length*, 44 or 45 by 56: *Bishop's whole length*, 58 by 94.

**CANVAS, SHIP'S**. See **SAIL**, **SAILCLOTH**.

**CANVAS-BACK**, *fuligina* (*aythya*) *vallisneria*, a species of duck frequenting the Atlantic coast of the United States, greatly prized for its flesh. The canvas-back reaches

its highest perfection in and around Chesapeake bay, where these birds pass the winter after returning from their breeding grounds in the far north-west. In its annual migrations it is taken in great numbers in the marshes which surround the southern extremity of lake Michigan, where the *sostera vallisneria*, or so-called wild celery, known to be identical with the plant of that name in the Chesapeake bay, abounds, the root of which is the favorite food of this duck. The male is showily marked with red, black, and white, and the lower part of the back, which is of an ashen hue, is broken by fine lines of black into divisions or squares like those in a piece of canvas. The canvas-back is noted for its swift flight, for an insatiable curiosity which leads it to approach within gunshot if its attention is attracted by any unfamiliar object on shore, and for its delicate flesh, which is highly esteemed by epicures. The red-head duck (*F. Americana*) is an allied species.

**CANZO'NÉ** is the name of one of the oldest and most prized forms of the Italian lyric. The word is borrowed from the Provençals, whose *canós* or *chanós*, however, were not restricted to any precise form, but were simply verses intended to be sung. The Italian writers first attempted to regulate the wayward and arbitrary character of the Provençal *canós*; Dante, and subsequently Petrarch, being especially successful. The *canzone* *Petrarchesca* or *Toscana* was any considerable lyrical poem, composed of stanzas exactly corresponding to one another in number of lines, measure, and position of rhymes, and which customarily closed with a short stanza. About the end of the 16th c., the Italian writers began to deviate from the strict form of the Petrarchian canzone. Torquato Tasso and Chiabrera are the most notable names in the new movement. The most of the canzones of the latter—called by their author *canzonetto*—are written in short lines and stanzas, the position of the rhymes being also completely arbitrary.

**CANZONET**, a diminutive of the Italian canzone—a variety of lyric poetry, which closely resembled the madrigal. Canzonet is applied to short songs of light and airy texture. Morley published canzonets selected from Italian composers in 1597; and Haydn left two examples, *She never told her love* and *My mother bids me bind my hair*.

**CAOUTCHOUC.** See INDIA RUBBER.

**CAP**, in ship-building, is a strong, thick block of wood fixed near the top of each mast; it has a hole to receive the upper end of the lower mast, and another to receive the lower end of the topmast, with eyebolts to aid in hoisting the topmast. There is also a C. of smaller size at the point of junction between the topmast and the top-gallant-mast. When made of iron, the C. is called a *crance*.

**CAP.** See PERCUSSION CAPS.

**CAPABILITY BROWN**, a successful landscape gardener of the last century, much inclined to the use of the word "capability."

**CAPACCIO**, a town in the province of Campania, Italy, 25 miles s.e. of Salerno. Population about 3000.

**CAPACITY, LEGAL**, is such a condition of individuals, in regard to their natural qualities and actual position under the constitution of the country, as fits them for the application of the laws civil and criminal. Generally speaking, all persons have this legal capacity excepting aliens, persons attainted, convicts, insane persons, and to some extent also infants, married women, and persons under duress. See ALIEN; ATTAINDER; CRIME; FEME COVERTE; HUSBAND AND WIFE; INFANT; LAW OF CONTRACTS; LUNACY; MARRIAGE.

**CAP-À-PIE** (Fr. head to foot), in the military language of the middle ages, was applied to a knight or soldier armed at all points, or from head to foot, with armor for defense and weapons for attack.

**CAPARISONED**, in heraldry. A war-horse completely furnished for the field is said to be caparisoned.

**CAPE**, in geography, the extremity of a portion of land projecting into the sea beyond the general line of the shore. On a low sandy coast, a C. generally forms an obtuse angle, being merely a change in the trending of the land. On rocky shores, capes usually form acute angles, and are here sometimes called points or promontories.

**CAPE AGULHAS.** See AGULHAS.

**CAPE ANN**, in n.e. Massachusetts, 81 m. from Boston; 42° 38' n., 70° 35' w.; has two fixed white lights on Thatcher island, 161½ and 165½ ft. above mean high water, visible for 19 nautical miles; also a 10-in., steam fog whistle. There are valuable stone-quarries at the cape. The whole rocky peninsula generally included under this name, projects about 20 m. into the Atlantic ocean. The s. and e. shores have many attractive summer resorts.

**CAPE BAB-EL-MANDER.** See BAB-EL-MANDEB.

**CAPE BIANCO**, the most northerly point of Africa, on the Mediterranean; 37° 20' n., 9° 48' east.

**CAPE BLANCO**, or **ORFORD**, in s.w. Oregon,  $42^{\circ} 45' \text{ n.}$ ,  $125^{\circ} 45' \text{ w.}$ ; 25 m. from the mouth of the Rogue river. A little s. of the cape is Port Orford. There is a fixed white light on the extreme w. point of the cape, 256 ft. above sea level.

**CAPE BLANCO**, on the w. coast of Africa. See **BLANCO**.

**CAPE BOE'0**, the w. point of Sicily, a mile from Marsala;  $37^{\circ} 28' \text{ n.}$ ,  $12^{\circ} 25' \text{ east}$ . Off this cape, in 241 B.C., the Romans gained a naval victory over the Carthaginians, closing the first Punic war.

**CAPE BOJADOR'**. See **BOJADOR**.

**CAPE BRETON**, a rocky island of irregular form in British North America, stretching in n. lat. between  $45^{\circ}$  and  $47^{\circ}$ , and in w. long. between  $60^{\circ}$  and  $61^{\circ} 30'$ . It is separated from the peninsula of Nova Scotia by Chebucto or Chedabucto bay and the gut of Canso; contains 3120 sq. m., with a pop. (1891) of 86,854. Its principal exports are pine, oak, birch, maple, fish, and coal. Though the island produces maize and other grains, yet it depends for its breadstuffs chiefly on the United States. C. B. originally a French possession, was taken by the English in 1745; but being subsequently restored to France, it was again captured in 1758, and ceded in 1763. After having been for a time a distinct colony, it now forms part of the province of Nova Scotia. The towns are Sydney, Arichat, and Port Hood, the once famous Louisbourg, stripped of its fortifications, having become merely a village.

**CAPE BRETON**, a co. in e. Nova Scotia, a part of the island of the same name, nearly surrounded by the ocean; pop. '91, 34,244. Coal is the chief production. Chief town, Sydney.

**CAPE CANAVERAL**, about the middle of the Atlantic coast of Florida,  $28^{\circ} 27' \text{ n.}$ ,  $80^{\circ} 33' \text{ west}$ . It has a light flashing white every minute, 137 ft. above mean high water. There are dangerous shoals around the cape.

**CAPE CHARLES**, at the n.e. entrance of Chesapeake bay, Virginia. On Smith's island is a flashing white light, signaling "45" every 30 sec., 180 ft. above mean high water. This cape is the extreme s. projection of the "eastern shore" of Maryland.

**CAPE CLEAR**, a high promontory on the s. side of Clear island, co. Cork, Ireland, usually the first land seen when steamers are approaching England from America. There are two lights, one in  $51^{\circ} 26' \text{ n.}$ ,  $9^{\circ} 29' \text{ w.}$ ; and one on Fastnett rock,  $3\frac{1}{4} \text{ m. n.w.}$  by s. from the cape, 148 ft. above high water.

**CAPE COAST CASTLE**, formerly the capital of the settlement of Great Britain in north or upper Guinea, lat.  $5^{\circ} 5' \text{ n.}$ , and long.  $1^{\circ} 13' \text{ west}$ . The place, as its name implies, is defended by a fort, or rather by three forts. It has a pop. of 10,000.

**CAPE COD**, the sickle-shaped peninsula forming the south-eastern extremity of Massachusetts, and nearly co-extensive with Barnstable county, extending from Sandwich to Race point in lat.  $42^{\circ} 3' 40'' \text{ n.}$ ; long.  $70^{\circ} 4' 18'' \text{ west}$ . It is about sixty-five miles long, and beyond Sandwich rarely exceeds eight miles in width; encloses Cape Cod bay, and is broken by many harbors, that of Provincetown being one of the best on the New England coast. On the seaward side or highlands is a fixed white light, 183 ft. above mean high water, and at Race point is a fixed white light varied by a white flash every 90 sec.,  $41\frac{1}{4} \text{ ft.}$  above high water. Discovered by Gosnold (q.v.) in 1602, and named from the abundance of the fish in its waters, the cape was visited by Henry Hudson in 1609, who supposed it to be an island, and called it New Holland. Charles, Prince of Wales, attempted to change the name to Cape James in honor of his brother. The cape is sandy, and in part consists of rolling grass-land, but there are fertile portions, and toward the north it is well wooded. Small ponds abound, and salt marshes border the southern shores. The Old Colony railroad extends through the peninsula, and a ship-canal to connect Cape Cod and Buzzard's bays has been partly constructed. See Thoreau's *Cape Cod*.

**CAPE COLONY**. See **CAPE OF GOOD HOPE**.

**CAPE COM'ORIN**. See **COMORIN**.

**CAPE DIAMOND**, the high rock at the junction of the St. Lawrence and the St. Charles, on which stands the citadel of Quebec.

**CAPE DISAPPOINTMENT**, or **CAPE HANCOCK**, the s.w. point of the state of Washington, at the entrance of Columbia river;  $46^{\circ} 16' \text{ n.}$ ,  $124^{\circ} 2' \text{ w.}$ ; has a white light 232 ft. above the water.

**CAPE DUCATO**. See **DUCATO**.

**CAPE ELIZABETH**, in the town of that name in Cumberland co., Me., 6 m. s.e. of Portland,  $43^{\circ} 33' \text{ n.}$ ,  $70^{\circ} 11' \text{ w.}$  There are two lights, one fixed and one fixed with white flashes. The town is a suburb of Portland, and a popular summer resort; pop. '90, 5459.

**CAPE FAREWELL**, the s. point of Greenland, a precipitous headland on an island;  $59^{\circ} 49' \text{ n.}$ ,  $43^{\circ} 54' \text{ w.}$  The currents, the ice, and the winds combine to make this probably the most boisterous point on the globe.

**CAPE FEAR**, the s. point of Smith's island at the mouth of Cape Fear river in North Carolina;  $33^{\circ} 48' \text{ n.}$ ,  $77^{\circ} 57' \text{ w.}$  On Bald head is a white light flashing every 30 sec.

**CAPE FEAR RIVER**, in North Carolina, formed by the Haw and Deep rivers, and affording navigation from the ocean to Wilmington, and further for steamboats. It enters the Atlantic n. of Smelt island.

**CAPEFIGUE**, BAPTISTE HONORÉ RAYMOND, a French publicist and historian, was b. 1802 at Marseilles. He studied law at Aix, and in 1821 proceeded to Paris, for the purpose of completing his judicial course, but soon betook himself to journalism and authorship. He held a post in the foreign office until 1848. This, however, did not interfere with his amazing activity. Besides contributing extensively to many of the Parisian journals, C. also "manufactured" not less than a hundred volumes of history—not, indeed, intrinsically valuable, but indicating wonderful facility in the use of the pen. The best is the *Histoire de la Restauration* (3d edit., 1842). C. also published of late years many interesting biographical works. He d. 1872.

**CAPE FINISTERRE**. See FINISTERRE.

**CAPE FLATTERY**, the extreme w. point of the United States (except Alaska), in the state of Washington, s. of the strait of Juan de Fuca. On Tatoosh island is a fixed white light, with a fixed red sector between s.e.  $\frac{1}{2}$  s. and s.s.e.  $\frac{1}{2}$  e.

**CAPE FLORIDA**, the s. extremity of Key Biscayne in Dade co., Fla., e. of the Everglades.

**CAPE GATA**, or **CAPE DE GATTE**, a promontory of Spain in the province of Granada, extending into the Mediterranean; a mass of rock about 24 m. in circumference. The most notable of the pile is the ancient Promitorium Charidemi, the Moorish Kheyran, and is formed chiefly of agates, spars, and crystals. The cape was once a resort of Moorish pirates.

**CAPE GIRARDEAU**, a co. in s.e. Missouri, on the Mississippi, and the St. Louis and Iron Mountain railroads. It is level, fertile, and well cultivated; producing wheat, corn, oats, potatoes, tobacco, etc.; 540 sq. m.; pop. '90, 22,060, includ. colored. Co. seat, Jackson.

**CAPE GIRARDEAU**, a city in the co. of the same name in Missouri; on the Mississippi river and several railroads; 50 m. above Cairo, Ill. It is in a rich and well-cultivated section. St. Vincent's college, Roman Catholic, and the Southeast Missouri State Normal school, are the principal public institutions. The city has large river commerce. Pop. '90, 4297.

**CAPE GUARDAFUI**. See GUARDAFUI.

**CAPE HATTERAS** is the point on the coast of North Carolina stretching furthest into the Atlantic, and by far the most dangerous part of the American coast for navigators, on account of shoals and frequent gales and storms. Coasting vessels are apt to be crowded up toward this cape by the gulf stream, which is only about 20 m. east. The cape has a light, flashing white every 10 sec., 191 ft. above mean high water, also a beacon light, flashing white, 27 ft. high. Cape Hatteras is one of the most desolate regions on the U. S. coast.

**CAPE HAYTIËN** (formerly called *Cape Français* and *Cape Henri*), a seaport t. of the island of Hayti, on its n. coast, in lat.  $19^{\circ} 40' \text{ n.}$ , long.  $72^{\circ} 54' \text{ west.}$  It is pleasantly situated on a small bay, partly encircled by hills, has wide and well-paved streets, and some handsome squares. A great portion of it, however, is in ruins, the effects of the revolutionary wars at the end of last century. Safe anchorage is found within the harbor, which, however, is rather difficult of access. C. H. carries on a considerable trade with the United States. Pop. estimated at 20,000.

**CAPE HENLOPEN**, on the e. coast of Delaware, at the s. entrance of the Delaware bay, 13 m. s.s.w. of Cape May, which is in New Jersey, on the other side of the entrance. Cape Henlopen is in  $38^{\circ} 47' \text{ n.}$ ,  $75^{\circ} 5' \text{ w.}$ , and has a fixed white light, with a fixed red sector between s.e.  $\frac{1}{2}$  e. and s.  $\frac{1}{2}$  e., 126 ft. above mean high water.

**CAPE HENRY**, on the coast of Virginia, at the s. entrance to Chesapeake bay, opposite to Cape Charles in Maryland;  $36^{\circ} 56' \text{ n.}$ ,  $76^{\circ} 4' \text{ w.}$ ; has a fixed white light, with a fixed red sector between s.s.e. and s.w. by w., 157 ft. above mean high water.

**CAPE HORN**, or **HOORN**, the most southerly point of America, terminating an island of its own name, in the archipelago of Terra del Fuego. It is in lat.  $55^{\circ} 58' 40'' \text{ s.}$ , and long.  $67^{\circ} 16' \text{ w.}$ , having a perennially antarctic climate, and being in itself merely a detached link, bare and rugged, of the chain of the Andes. It was discovered by Schouten, a native of Hoorn in Holland, about 90 years later than the Strait of Magellan, and since then the course of navigation of sailing vessels has been round the cape instead of through the strait.

**CAP'EL**, ARTHUR, Lord, 1610-49; representative of Hertford, in the long parliament of 1640. He was a royalist officer, acting with lord Colchester and Edward Hyde as a general, and was in the actions of Bristol, Exeter, and Taunton. At Colchester,

he was compelled by famine to surrender to Fairfax. He was tried for treason and executed Mar. 9, 1649. He was the author of *Daily Observations or Meditations*.

**CAPEL**, THOMAS JOHN, b. 1836; an English Roman Catholic priest. When but 17 years old, he, with others, founded a normal training college for the education of school-teachers, of which, in 1856, he was made vice-principal. Being compelled to seek southern Europe on account of ill health, he founded at Pau a mission for English-speaking Roman Catholics, in consequence of which the pope advanced him to "monsignore," a position equivalent to that of bishop. Returning to England, in 1873 he established the Roman Catholic public-school at Kensington, and devoted much of his time to preaching, becoming widely noted for his eloquence. He is said to be the original of Catesby in D'Israeli's *Lothair*. In 1874, he published a *Reply to Gladstone's Political Expostulation*, and in 1884 "*Catholic*," *An Essential and Exclusive Attribute of the True Church*. He lived in California many years.

**CAPEL COURT**, in Bartholomew Lane, London, the place of meeting for the British Stock Exchange, and so by metonymy often used as equivalent to the stock exchange. Previous to 1773, the London stock brokers conducted their business in and about the Royal Exchange, but in that year, having formed themselves into an association under the name of the Stock Exchange, they removed to Capel Court. In 1801, the growth of business necessitated the erection of a new building in Capel Court. In 1854, and again in 1886, considerable additions were made to the buildings, which now include two large halls, where the various markets are held, settlement rooms, reading room, committee rooms, managers' rooms, and other offices. It is intended ultimately to remove the partition between the two halls, when one vast business apartment, having an area of about 16,000 square feet, will be available for the use of members.

**CAPE LA HAGUE**, a promontory of France, forming the n.w. extremity of the peninsula of Cotentin, in the department of Manche. It juts out into the English channel, opposite the island of Alderney, and about 16 m. n.n.w. of Cherbourg, and 50 m. s. of St. Alban's Head, in Dorsetshire.

**CAPE LA HOGUE**, often confounded with cape la Hague, is situated on the e. side of the same peninsula. Here the English and Dutch fleets defeated the French in 1692.

**CAPELIN**, *Mallotus Grœnlandicus*, a small fish of the family of *salmonidæ*, extremely abundant on the coasts of Newfoundland, and much used as bait in the cod-fishery. It is also, in a dry state, an article of commerce, and is imported, although not very largely, into Britain, where it sometimes appears on the breakfast or supper table. Its flavor, which is very agreeable, suggests to most persons the idea of its belonging to the herring rather than the salmon family. It is nearly allied to the smelt.

**CAPELLA**, a bright star of the first magnitude, on the left shoulder of Auriga. C. is also called Capra or the *She-goat*, a name also sometimes given to Capricorn.—The poets fable C. to be Amalthea's goat, which suckled Jupiter in his infancy.

**CAPELLA**. See A CAPELLA.

**CAPELLA**, MARTIANUS MINEUS FELIX, a learned author belonging to the second half of the 5th c., was born in Africa, but where is not definitely ascertained. Of his life nothing whatever is known. The work which has preserved his name to posterity is the *Satiricon*, a kind of encyclopædia, highly esteemed during the middle ages as a work of reference. It is written in a medley of prose and verse, and is full of curious learning, but possesses no literary value; the style has all the bombastic pomp of the African school of later Latinists. It consists of nine books. The first two consist of an allegory, *The Nuptials of Philology and Mercury*, while the remaining seven are devoted to the "liberal arts," grammar, dialectics, rhetoric, geometry, arithmetic, astronomy, and music. The first edition of the *Satiricon* appeared in 1499, under the care of Franciscus Bodianus; the best in 1886, under the care of Eyssenhardt.

The book on astronomy is remarkable as containing a hint of the true theory of the solar system. Mercury and Venus are there declared to move round the *sun*, and not round the *earth*; and their relation to these bodies is properly explained.

**CAPE LOOKOUT**, on the e. coast of North Carolina, 85 m. s.w. of cape Hatteras; 34° 7' n., 76° 33' w., having a fixed white light 156 ft. above mean high water.

**CAPE MATAPAN**, the s. extremity of the continent of Europe, in Greece, between the gulf of Laconia, and Kalamatia, 36° 23' n., 22° 29' east. The ancient Greeks called it Tenarium, and made it sacred to Neptune, whose temple stood near the cape.

**CAPE MAY**, the s. point of New Jersey, at the n.e. entrance to Delaware bay. There is a "light flashing white every 30 sec., 164½ ft. above mean high water."

**CAPE MAY**, a co. in s. New Jersey, on the ocean and Delaware bay, intersected by the South and West Jersey and other railroads; 255 sq.m.; pop. '90, 11,268. The surface is level, and somewhat swampy, with alluvial soil, producing grain, hay, and fruit. In one of the swamps is a deposit of cedar trees, the timber of which is still good, though it must have been underground more than 2000 years. Co. seat, Cape May Court-house.

**CAPE MAY**, a city, and celebrated wateringplace, in Cape May co., N. J.; connected with Philadelphia by railroad; sometimes called Cape City or Cape Island city. There is a fine beach several miles long, and the bathing facilities are of the first order. The hotels are numerous, and of modern construction, and in summer the place is the favorite resort of Philadelphians as well as of people from cities more remote. The climate is usually equable and pleasant. Pop. '90, 2136.

**CAPE MENDOCINO**, in Humboldt co., Cal., the extreme w. point of the state;  $40^{\circ} 26' 24''$  n.,  $124^{\circ} 23' 27''$  west. There is a flashing light 423 ft. above the water.

**CAPE NORTH.** See **MAGEROE**.

**CAPE ORTEGAL**, the n. extremity of Spain, projecting into the bay of Biscay in the province of Corunna;  $43^{\circ} 47'$  n.,  $7^{\circ} 56'$  w.; on a rugged and barren coast.

**CAPE OF GOOD HOPE**, popularly regarded as the most southerly promontory of Africa, though it is half a degree to the n. of Cape Agulhas. The latter is merely a projection on a coast-line, which diverges inconsiderably from a parallel; but the former is really the turning-point from s. to e. on the voyage from Europe to India. This celebrated promontory is in lat.  $34^{\circ} 22'$  s., and long.  $18^{\circ} 29'$  e., being the termination of Table mountain, which, as it recedes towards the bay of its own name, rises from the height of 1000 ft. above the sea to that of 3,532. The cape (for so it is called by way of eminence) was discovered and doubled by Diaz, a Portuguese navigator, as early as 1486—six years before Columbus, in aiming at the same goal by a different route, led the way to America. But it was only in 1497 that Vasco da Gama realized the value of Diaz's discovery, by rounding it on his adventurous voyage from Lisbon to Calicut. The result was not merely to open a new channel for the traffic of the east, but it was also to transfer trading superiority from the republics of Italy to the states of Western Europe.

**CAPE OF GOOD HOPE**, a British colony, was so called from the cape on its s.w. extremity. It was established by the Dutch in 1652, some attempts at a settlement having been previously made by the Portuguese. The former only intended it at first as an intermediate station between Holland and their East Indian possessions; and at first occupied only a small tract of ground on the slopes of Table Mountain, with some portion of the adjoining flats; but they had in their neighborhood scattered tribes of improvident natives, singularly feeble of purpose, and incapable of organization on a large scale. The tide of immigration set in from Holland, and when the country was finally taken possession of by the British in 1806 (there having been a brief occupation of it from 1796 till 1803), the Dutch had extended their dominion as far to the e. as the mouth of the Great Fish river, and from that point in a waving line across the country to the w., a little s. of Orange river.

In entering upon the government of this large territory, the British found themselves face to face with a race of a totally different sort from that of the purposeless Hottentot—a people styled Kaffirs, mainly of Arab descent, consisting of tall, athletic, finely formed men, of warlike dispositions, with an incurable propensity to steal from any one, provided he was not of their own tribe, and particularly so if he was a foreigner. The inevitable result was a succession of wars—those, namely, of 1812, 1819, 1823, 1835–36, 1846–47, 1851–52.

**CAPE COLONY** proper is bounded on the n. by the Orange river and the Kei. But of late the area of this British possession has been greatly extended by the annexation of districts lying to the northward. Of these successive annexations the most important are that of British Kaffraria (see **KAFFRARIA**) in 1866; of Basuto-land, lying in the upper basin of the Orange river, in 1868; of two vast districts across the Kei called Fingo-land and Noman's-land, now called Griqualand East (q. v.), in 1875; of Griqualand West, in 1876; and of the Transvaal (q. v.) in 1877. The area of Cape Colony with its districts is 221,311 sq. m.; and its pop. in 1891 was 1,527,224, of whom 376,987 were Europeans.

The highest range of mountains within the colony is 9,000 ft. above the sea. The mountains keep at a distance from the coast-line of from 30 to about 100 m., and receive different names on their course, such as the Stormberg, Sneeuwberg, Nieuwveld, Roggeveld, and Kamiesberg. Between this principal range and the sea on the e., there are two other ranges less continuous and regular, the intermediate one generally more distant from the first than they are from each other.

South Africa being not far from the region of the trades, s.e. winds prevail, especially in the summer time; the only other wind that may be said to blow is that from the n.w., which prevails during the colder months. But whichever of these two winds predominates—the one bearing a supply of rain from the Indian ocean, the other, if less frequent, more richly laden from a part of the Atlantic nearer the line than the country which it fertilizes—it fails to deposit its stores on the opposite side of the principal water-shed which crosses its path. Hence the curious fact of the transposition of seasons in the same latitude. As the harvest in such latitudes depends more on the supply of rain than anything else, people are reaping on the one side of the country whilst they are sowing and planting on the other. Certain parts of the country are liable to long continued droughts, because while very heavy rain-falls take place, the rain is confined to a particular part of the year. The country, however, is admirably adapted

for the storage of water. In many places one meets with the successive beds of dried-up lakes, with a narrow outlet at the lower ends, through which a periodic stream flows. By closing up this outlet, artificial lakes or dams may be formed to almost any extent, and of unlimited number; and from the steepness of the slope, the lands lower down admit easily of being laid under water.

The mineral wealth of the colony is very great. There are remarkably rich diamond fields in West Griqualand, and for several years diamonds were the most important article of export. One of the chief towns in the colony, Kimberley, owes its rapid growth and prosperity to the diamond mining. The exports of diamonds in 1895 amounted to £4,775,018, and were the chief among the articles of colonial production, for although the gold exported in that year was nearly £8,000,000 it really was imported from Transvaal for re-exportation. The next mineral in importance is copper ore. Coal is also found, and its output has increased since the construction of railways. Among other minerals may be mentioned manganese, lead ore, iron ore, and zinc blende. In regard to manufactures there were, according to the census of 1891, upward of 2,000 industrial establishments, including flour mills, breweries, tobacco factories, tanneries, together with diamond, gold, copper and coal mines. The rearing of live stock is the principal employment, and the graziers for the most part own the lands which they occupy.

There is in the colony almost a total want of navigable rivers, but the system of railways is rapidly extending. In 1890, there was a mileage of about 600 miles open for traffic, the existing lines being mainly connected with three systems—the western, starting from Cape Town; the Midland, starting from Port Elizabeth; and the North-western, also from Port Elizabeth. The railways are all the property of the government. Direct telegraphic communication with Europe was established, in 1879, by the East African submarine cable from Aden to Natal, and thence by the land lines. The shipping at Cape Town is now secure by a breakwater and docks. The same cannot be said of Port Elizabeth, East London, and the Kowie; but measures are being taken which, it is hoped, will result in making these also safe from the fierce e. winds.

This splendid country is at present occupied by an assemblage of very varied races. The Portuguese were the first Europeans who landed here. The Dutch are probably still the most numerous, notwithstanding the exodus to the Orange River Free State, prompted by the slave question. Next in number are the English, by whom some parts of the country, particularly in the e., are occupied almost exclusively. The French are also largely represented, many refugees having settled in it subsequently to the revocation of the edict of Nantes, but they are now nearly absorbed in the Dutch population. They were at first located principally in the w., where they introduced the culture of the vine, but their names are now found in almost every part of the land. There is also a considerable importation of Germans, who have been settled on the frontiers adjoining the Kaffirs for defensive purposes. As regards the colored inhabitants, large numbers of Kaffirs have been retained in the districts which they formerly occupied, and others have come into the country as shepherds and servants. There is a large number of people of Malay origin in and around Cape Town, and in towns on the e. coast, who gain a livelihood as fishermen, porters, and the more laborious sorts of skilled labor. There are a few Mozambiquers and Hottentots, besides a number of half-castes, to whom the name of Afriander properly belongs.

The constitution of the country, after several changes, was fixed in its present form by an act passed by the colonial legislature in 1872, which provides for responsible government. There are two elective chambers, the upper house consisting of 23 members, elected for seven years. There are seven electorate provinces in the colony, and each chooses three members to the upper house. One is added for Griqualand West and one for Bechuanaland. They are presided over by the lord chief justice. To the lower house, or house of assembly, two representatives are appointed by each division of the colony, with the exception of the Cape district, which, as being more populous, returns four. They amount in all to 79, and are presided over by a speaker of their own choice. The governor carries on the administration along with a ministry of 5 members—the colonial secretary, the attorney-general, the treasurer-general, the commissioner of crown lands and public works, the secretary for native affairs. The supreme court, which has its sittings in Cape Town, has two judges beside the lord chief justice. Another court holds its sittings in Graham's Town, in which there are two judges only, but there lies an appeal to the supreme court. In other parts of the colony, justice is administered by the judges going on circuit. A colonial university has recently been founded.

Wool is the staple product of the colony; ostrich farming and the culture of the vine are carried on. The following tables show the exports and imports of the colony for recent years:

	Imports.	Exports.
1880.....	£8,078,048	£4,488,872
1888.....	7,018,885	8,964,449
1895.....	19,004,880	16,904,756

The Cape Colony is not exceptional in showing a decline in imports and exports in 1877; but the insecurity caused by the troubles ending in the Zulu war of 1879 has told against the prosperity of the colony. The official tables include in the returns of revenue also the loans raised by the government.

	Revenue.	Expenditure.
1875.....	\$2,246,179	\$2,272,275
1880.....	3,541,720	3,742,665
1888.....	3,427,609	3,285,512
1895.....	5,416,612	5,388,157

**CAPE PALMAS**, the s. extremity of Liberia, Africa, 4° 27' n., 7° 44' west. This was the point at which the Maryland colony of free colored emigrants settled in 1834. The surrounding country is one of the Liberian states, and is called Maryland. There is a light-house on the cape.

**CAPE PRINCE OF WALES**, in Behring sea, the w. point of the mainland of Alaska, directly opposite to East cape in Siberia, the strait between the two being the narrowest water between America and Asia. The cape is a few miles s. of the arctic circle, and terminates in a bold bluff, n. of which are dangerous shoals.

**CAPE RACE**, the s.e. point of Newfoundland, usually the first American land seen by steamers from England, 46° 40' n., 52° 54' west. There is a revolving light 150 ft. above the sea. The cape terminates in a bold rough headland.

**CAPERCAIL'LIE**, **CAPERCAILLIE**, **WOOD-GROUSE**, or **COCK OF THE WOODS** (*tetrao urogallus*), the largest of the gallinaceous birds of Europe. It is a species of grouse (q. v.), almost equal in size to the turkey; the male, which is the largest, sometimes weighing fifteen pounds or more. In figure and appearance, it much resembles the black-cock, but the tail of the male C. is rounded, and not forked, as in that species; and the male C. has the feathers of the head elongated. The general color of the adult male is brownish black, minutely freckled with grayish white, and with lighter brown; the quill-feathers dark brown; the tail-feathers nearly black, some of the longer tail-coverts on the sides of the tail tipped with white; the chest is of a shining dark green; there is a small scarlet patch of naked skin above the eye, and the bill is whitish. The general color of the female and of young males is dark brown, freckled with yellowish brown; the front of the neck and the chest are yellowish chestnut; and the feathers of the under parts are generally edged with white. The C. has the feet feathered to the toes, but the toes are naked. It is an inhabitant of pine-woods; feeds on berries, seeds, worms, insects, etc., and on the young shoots of the pine, greatly preferring the Scotch fir to the spruce; occasionally also eating, at least in winter, the buds of the birch and other trees. The female makes her nest on the ground, and lays from six to twelve eggs, of a pale reddish or yellowish brown, spotted with other shades of brown, and more than 2 in. long. Like the black-cock, the C. is polygamous.—The geographical distribution of the C. is very extensive: it is found on the pine-covered mountains of all parts of Europe, from Spain and Italy almost to the North cape, and is abundant in the northern parts of Asia. It was at one time found both in Scotland and Ireland, but was completely extirpated about the end of the 18th or beginning of the 19th century. Through the exertions, however, of the earl of Fife and other proprietors of great Highland estates, but particularly of the marquis of Breadalbane, it has again been restored to the forests of the Highlands of Scotland. The C. is very capable of domestication, and breeds readily, if allowed the range of a space containing a few pine-trees. It is much esteemed for the table. The market of Stockholm is well supplied with it in winter; and since the establishment of steam communication, it has been regularly brought from Scandinavia to London.

**CAPE RIVER**, properly *Fauntke*, taking its popular name from the proximity of its mouth to cape Gracias a Dios, on the e. reach of the Mosquito shore in Central America. After a generally n.e. course of nearly 800 m., it enters the Caribbean sea, about lat. 14° 55' n., and long. 88° 11' w., being navigable for a considerable distance upwards.

**CAPERNAÛM**, meaning "the field of repentance," or "city of comfort," was in the time of our Savior a favorite and exalted city, and one of the three which he upbraided "because they repented not." It was situated on the north-western coast of the sea of Galilee, or lake of Genesareth. It is now a heap of ruins, extending more than a mile along the shore and back towards the mountains, so overgrown with grass and bushes, that it is difficult to move among them. C. is called by the natives of Syria Tell-hün.

**CAPERS** are the pickled flower-buds of the caper-bush (*capparis spinosa*). They have an agreeable pungency of taste, with a slight bitterness, and have long been in very general use as a condiment and ingredient of sauces, along with boiled mutton and other kinds of food. They possess medicinal properties, being antiscorbutic, stimulant, and laxative. They are of a grayish green color, to improve which, however, copper is sometimes used, as in the case of gherkins and other pickles, rendering them poisonous. This can be detected by thrusting a polished iron rod into the vessel which contains the C.; the surface of the rod soon becoming coated with copper, if it is present.—The caper-bush is a native of the s. of Europe, and other countries near the Mediterranean. It is extensively cultivated in some parts of the s. of France and in Italy, but most of all in Sicily. It succeeds in the open air even at Paris, but in Britain requires the aid of artificial heat. It is a trailing, rambling shrub, loving dry places, and often growing on rocks or walls, adding a fresh charm of beauty to many an ancient



ruin. It begins to flower early in summer, and continues flowering till winter. The buds are gathered every morning, and are immediately put into vinegar and salt: at the end of the season, they are sorted according to their size and color, the greenest and least expanded being the best, and are again put into vinegar, the finest being sent to the market in bottles, the coarser in small barrels. The fruit, which is a small berry, is also pickled in the s. of Italy. The flower-buds of the caper of Mount Sinai (*capparis Sinaica*) are pickled like those of the common species; the seeds are also pickled, and are called by a name signifying mountain pepper. The fruit of *capparis aphylla* is made into a pickle in India. Species of *capparis* are numerous in India, the warm parts of America, etc. See CAPPARIDÆ.—Various substitutes for C. are sometimes used, as the flower-buds of the marsh marigold (*caltha palustris*), those of the Indian cress (*tropaeolum majus*), and those of the bean caper (*zygophyllum fabago*). The cape tree (*Capparis Jamaicensis*), which grows throughout the West Indies, in South America, and in Florida, is a small tree with a very hard wood.

**CAPERS, WILLIAM, D.D.**, 1790-1855; a Methodist minister of South Carolina, in early life a missionary among the Indians in Georgia. He was for several years presiding elder in Charleston, where he edited the *Wesleyan Journal*, afterwards merged in *Zion's Herald*, and still later changed to the *Christian Advocate and Journal*, of New York. In 1838, he was representative to the Wesleyan conference in England, and in 1855 was chosen professor of the evidences of Christianity in the South Carolina university. In 1846, he was elected bishop, and filled the office until his death.

**CAPE SABLE**, the s. point of the mainland of Florida, and the s.e. extremity of the mainland of the United States, 26° 55' n., 81° 15' west.

**CAPE SABLE**, the s. point of Nova Scotia, 43° 26' n., 66° 38' west. There is a light on Cape Sable island, which island has a pop. of about 600 fishermen.

**CAPE SAN LUCAS**, the s. point of the peninsula of Lower California, 23° 44' n., 109° 54' west. Directly e. across the gulf is the Mexican port and city of Mazatlan.

**CAPE SAN ROQUE**, in n.e. Brazil, in the province of Rio Grande, 5° 28' s., 35° 16' west. Behind the cape is a bay, on which is the town of St. Joseph.

**CAPE SPARTIVENTO**, in s. Italy, in the Mediterranean, 37° 57' n., 16° 5' east. The ancients called it "Herculis Promontorium," and supposed it to be the most southerly point of Italy.

**CAPE ST. VINCENT**, a headland forming the s.w. extremity of Portugal, in lat. 37° 2' n., long. 9° w., is celebrated on account of two naval battles in which British ships were engaged, fought off it, one in 1693, the other in 1797. In the former, admiral Rooke, who with some 20 English and Dutch men-of-war was convoying a fleet of some 400 merchantmen, was attacked off this point by the French admiral De Tourville, and after a running fight lost several ships and 80 merchantmen. In Feb. 1797, sir John Jervis, with a fleet of 15 sail, gave battle to a Spanish fleet of 27 sail of the line, and defeated them, capturing four ships and driving the rest into Cadiz bay, where they were blockaded.

**CAPE ST. VINCENT**, a promontory on the east coast of Terra del Fuego.

**CAPETIAN DYNASTY**, the third Frankish dynasty, founded about the close of the 10th c., when Hugo Capet ascended the throne. The surname CAPET has been derived from *cappetus*, "a monk's hood," because, though duke of France, Hugo was also abbot of St. Martin de Tours. On the death of the last Carlovingian monarch (Louis V., surnamed *Le Fainéant*—i.e., the Slothful), Hugo, the most powerful of French vassals, seized the throne, and by moderation and prudent concessions made to the authorities of the church, as well as to his brother-nobles, who had made themselves independent, contrived to retain the power he had seized. He was crowned at Noyon, July 3, 987. In order to establish his dynasty, Hugo caused his eldest son Robert to be crowned as co-regent, 988. Capet first made Paris the capital of France. He died in 996; when his son Robert, a well-disposed but feeble ruler, ascended the throne, who died 1031, beloved by his domestics, but despised by his neighbors and vassals, forgotten by his people, and permitting all power to vanish from his hands. It was during his long lethargic reign that the towns and cities of France began to form themselves into corporations, to act in their own name, to contract obligations, and lay the foundations of middle-class freedom. In many other ways, also, the happy dissolution of royal power sowed the seeds of national prosperity. Robert's sons were Henry, who succeeded him, and Robert, ancestor of the older house of Burgundy.

Henry left two sons—Philippe I., who ascended the throne, and Hugo, who distinguished himself in the first crusade (1096), and died 1102. Philippe, under the regency of Baldwin, count of Flanders, came to the throne when only eight years old, and first really began to reign after the death of the regent (1066). He took hardly any part in the great movements and events of his times, but supported Robert, son of William the conqueror, in his rebellion against his father. Consequently, William commenced an expedition against Paris, and would probably have dethroned Philippe, but died in

1089. By his dissolute course of life, Philippe fell under a sentence of excommunication issued by pope Gregory VII. in 1094, and, after doing penance, died in 1108.

His successor, Louis VI., surnamed le Gros, had, during Philippe's lifetime, been active in the support of the crown, and now extended the royal power, which had been almost entirely confined within the duchy of Paris. By bold and vigorous measures he brought everywhere his vassals into real subjection to his authority, liberated the towns from baronial oppression, partly abolished feudal bondage, and extended considerably the jurisdiction of the crown. His life was an almost incessant contest with the small and turbulent vassals who had rioted in the license afforded them by the weakness of his predecessors. He died 1187, leaving a numerous family.

As his eldest son and co-regent, Philippe, had died during the reign of Louis, his second son, Louis VII., le Jeune, now came to the throne, and by his marriage with Eleanor of Guienne, heiress of the duke of Aquitaine, gained a considerable accession to the power of the crown. He engaged in the second crusade, and led 100,000 men to the east; but was unsuccessful, and returned to France after an absence of two years. In 1152, he divorced his unfaithful wife Eleanor, who subsequently married Henry Plantagenet, afterwards Henry II. of England. This marriage made Henry far more powerful than the king of France, and Louis would probably have lost his crown had not the disturbances in England—the quarrels with Becket and with his own sons—proved sufficient to occupy Henry's attention. Louis le Jeune died 1180.

Philippe Auguste (q.v.), his son by a third marriage, ascended the throne ten months before his father's death, and proved himself the most able ruler of the Capetian dynasty. Against the wishes of his family, he married Isabelle of Hainault, great-granddaughter of the last of the Carolingians, and thus finally united the two houses. His successor, Louis VIII., who died 1226, was said to have been poisoned by the count of Champagne, paramour of the queen, Blanca of Castile. Louis VIII. was followed by his son, Louis IX. (SAINT LOUIS, q.v.), who died at Tunis, 1270. Of the eleven children of St. Louis, the eldest, Louis, died aged 16 years, while the youngest, Robert, became the founder of the Bourbon dynasty (see **BOURBON**). The second son Philippe III., le Hardi, succeeded his father, and, by the decease of two brothers and two uncles, acquired possession of Poitou, Auvergne, and Toulouse. His son (Philippe IV., le Bel), acquired by marriage Champagne with Navarre. These acquisitions, and his attempt to secure for his uncle, Charles of Anjou, the throne of Naples, involved Philippe III. in contentions with Italy and Spain. He subjugated Navarre, 1276, and died of the plague in 1285. Philippe IV., le Bel, succeeded to the throne when 17 years old. He soon gave signs of a despotic character, plundered the estates of the church, defied papal authority, persecuted the order of Templars (q.v.), and removed the residence of the pope to Avignon. The atrocious act of burning the grand-master, with sixty knights, of the order of Templars, after they had recalled all the confessions drawn from them by torture, has left an ineffaceable blot on the name of Philippe le Bel. He died 1314, and left three sons and a daughter.

The eldest son, Louis X., le Hutin, who ascended the throne, displayed remarkable weakness of character, and died 1316. He was succeeded by Philippe V., le Long, second son of Philippe le Bel, who died without issue. By his death (1328) the crown came to Charles IV., le Bel, third son of Philippe le Bel, and the last of the direct line of the Capetian kings. He died 1328, leaving by his third marriage a daughter, named Blanche, who married Philippe, duke of Orleans, and died (1392) leaving no issue. Isabelle (daughter of Philippe le Bel) married Edward II. of England, and was mother of Edward III., who consequently took the title of king of France, which was retained by the kings of England until the reign of George III.; but Philippe of Valois, cousin of the last Capetian king, and grandson of Philippe III., le Hardi, claimed the crown of France by virtue of the Salic law, and so founded the dynasty of Valois (q.v.).

**CAPE TITMOUSE**, *Rarus capensis*, a small bird of the cape of Good Hope, remarkable for its curious nest, which is built of cotton or other fiber in the form of a bottle, and suspended from the limb of a tree. On the outside, near the opening, is built a pouch or pocket, in which the male bird rests while the female is on the nest, and when she leaves he manages by strokes of his wings to close the mouth of the nest, to prevent intrusion while they are in search of food.

**CAPE TOWN**, the capital of Cape Colony, faces Table bay to the n.e., is flanked by the mountain Lion's Head, with its continuation to Lion's Rump or Signal Hill, and has behind it the precipices of Table Mountain. Its lat. is 33° 56' s., its long. 18° 28' 7" east. Its mean temperature 58.8° F. for winter, 76.6° for summer, and 67.3° for the whole year. Pop. '91, with suburbs, 83,718. Two lines of passenger wagons connect it with the diamond fields, which are reached in about a week, railways with Worcester, etc., and electric telegraphs with the principal parts of the colony. It is the principal port for the coasting trade as well as foreign exports and imports, is well supplied with fish, as well as meat, dairy produce, and every sort of fruit and vegetables, at a moderate price. It has a supply of fresh water of excellent quality. C. T. is the seat of the government, the supreme court, and a college and university, a public library and museum, and an observatory. All the churches are well represented—the English Episcopal, the Roman Catholic, and representatives of Presbyterians, Lutherans, Wesleyans, Congregationalists, a Free church (chiefly an off-break from the Dutch church), a Jewish

synagogue, and a Mohammedan mosque, the Malay population being of that faith. There are also banks and insurance offices. The town is built upon a double slope, which subsides into a plain on the n.e. side. Its streets, at right angles to each other, are lined with houses, for the most part of an eastern type, with heavy walls, flat roofs, and large public apartments, interspersed with increasing numbers of shops and warehouses, of the sort to be met with in England.

The most remarkable structures are the breakwater, with the docks and patent slip; the castle, with its outworks and bastions; the barracks for the military, the Roman Catholic cathedral, with a few other places of worship; the museum and library, with the Botanic gardens in front; and between it and Government house, a park, with its avenues shaded by stately oaks. Out of town, a little distance to the n.w., is Somerset hospital, and the Royal observatory, about two and a half m. to the n.e.

Along the shores of Table bay there are modern defensive works, including a line of forts, some of which are equipped with heavy ordnance.

**CAPE TRAFALGAR.** See TRAFALGAR.

**CAPE VERD**, the most westerly headland in Africa, jutting out into the Atlantic ocean, between the rivers Gambia and Senegal, in lat.  $14^{\circ} 45'$  n., long.  $17^{\circ} 34'$  west. It was discovered by the Portuguese about 1445, and is said to have derived its name from a group of gigantic baobab trees which adorns its summit.

**CAPE VERD ISLANDS** (*Ilhas Verdes*), a group of islands belonging to Portugal, lying in lat.  $14^{\circ} 45'$  to  $17^{\circ} 19'$  n., and long.  $22^{\circ} 45'$  to  $25^{\circ} 25'$  w., and distant about 320 m. w. of the cape from which they take their name. The principal islands are ten—viz., Santiago, the largest and most important, Fogo, Brava, Malo, Boavista, San Nicoláo, San Antonio, San Vicente, San Luzia, and Sal. There are besides four islets, barren and uninhabited. The total area is about 1650 sq. m., with a pop. (1885) of 110,030. The islands are all very mountainous, and owe their origin to the action of submarine volcanoes. The highest elevation is reached in a volcanic peak, 9,157 ft. above the sea, on the island of Fogo, which is still active. The dry season extends from December to July; the rainy from August to September. The islands are occasionally visited by severe droughts, for the trade winds do not cause rain there. The climate is unhealthful during the rainy season. In spite of the drought the vegetation is luxuriant, yielding African and Southern European products. Sugar, cotton, coffee, tobacco, and indigo are grown, but the principal exports are *Jatropha curcas*, salt, corals, coffee, sugar, skins, brandy, Indian corn, beans, oranges, grapes, peanuts, cotton, and tobacco. Several of the European domestic animals thrive well. Turtles are abundant in the surrounding seas, and whales also are fished by British and American vessels. Amber is found on the coasts, and great quantities of salt formed by solar evaporation is obtained from the lagunes on the shores, especially on the island of Sal. The inhabitants, who are mostly negroes, indolent but harmless, speak a corrupted form of Portuguese, called *Língua Creoula*. The revenue for 1894-5 was estimated at 259,170 milreis, and the expenditure for the same year at \$265,757. The islands are under a governor-general, exercising both civil and military authority. The chief ports are Porto Praya, on the island of Santiago, and Porto Grande, the best harbor in the whole group, on the island of San Vicente. The islands were discovered about the middle of the 15th c. by the Portuguese, who shortly after colonized them.

**CAPE VINCENT**, a village and port of entry in Jefferson co., N. Y., on the St. Lawrence river and the Rome, Watertown, and Ogdensburg railroad; 25 m. n.w. of Watertown. It is connected with Kingston, Canada, by ferry, and in 1896 had imports valued at \$218,186, and exports, \$79,401. Pop. '90, 1324.

**CAPE WRATH**, a pyramidal promontory of unrivaled wildness and grandeur, forming the n.w. extremity of Scotland and of Sutherland, and running out into the Atlantic, in lat.  $58^{\circ} 38'$  n., and long.  $4^{\circ} 58' 5''$  west. C. W. is 600 ft. high.

**CAPIAS** (Latin, "you may take," or "seize"), a writ in a civil action ordering the officer to whom it is entrusted to seize and take into custody the person of the defendant. Strictly speaking, a *capias* issues only in a common law, as distinguished from an equity proceeding. The abolition of imprisonment for debt has greatly diminished the number of cases in which the defendant may be arrested in a civil action, but the right of an arrest in almost all, if not all, of the states still exists where a wilful and malicious injury or a fraudulent concealment of property, or proposed evasion of the jurisdiction of the court, is alleged. Usually an affidavit must be presented on which to base the application for a writ of *capias*. Of the several kinds of this writ the most common are: 1. The *capias ad respondendum*, which directs the sheriff to arrest the defendant and hold him until a certain day at which he is to be brought before the court. Formerly this writ began every action at law; now the cases in which the arrest may be made are limited and defined by the statutes of the states. When used alone the word *capias* usually refers to this form of writ; 2. *Capias ad satisfaciendum*, a writ directing the officer to seize the party to the suit named (this may possibly be a plaintiff, though usually a defendant) and bring his body on a fixed day before the court to satisfy a judgment already issued. It will be seen that this was at the end, as the former writ described was at the beginning, of all law suits under the common law; though the use of

the writ is now much restricted by statutory limitations, it is still a common law process ; it is familiarly known by the abbreviation *ca. sa.*; 8. *Testatum capias*, a supplementary or second writ, issued when an ordinary *capias* has been placed in the hands of the sheriff and has been returned with the endorsement that the defendant could not be found ; in such cases the new writ may be issued after a lapse of time without the introduction of other proof than the producing of the original.

**CAPILLARIES.** The tubes which convey the blood from the left side of the heart to the various parts of the body are termed arteries, while those which return it to the right side of the heart, after it has discharged its various functions in the body, are known as veins. The name of capillary (from *capilla*, a hair) is given to the minute vessels which form the connection between the terminal branches of the arteries and the commencements of the trunks of the veins. These little vessels are of various sizes, some admitting only one blood-corpuscle at once, while others are large enough to allow of the simultaneous passage of two, three, or more corpuscles. In the muscular tissue their average diameter is 0.008 of a line; they are smallest in the brain, and largest in bone. Their arrangement varies in different parts. In some cases, as in muscular tissue, they run for the most part parallel to one another; in other cases (as around fat-cells) they have a spherical arrangement, and in the skin and in parts of the intestines they form loops; and many other forms of distribution might be mentioned. These various arrangements have been discovered by the microscopic examination of tissues that have been successfully injected with colored fluids.

The circulation of the blood through the C. may be readily seen in the web between the toes of the hind-foot of the frog, in the tongue of that animal, in the tail or gills of the tadpole, in the wing of the bat, etc. See DIGESTION; SECRETION.

**CAPILLARY ACTION.** When a clean glass tube with a fine bore, open at both ends, is plunged into a liquid capable of wetting it, such as water, the liquid is found (1) to rise in the tube above the level of its surface in the vessel containing it; (2) to rise the higher in the tube above that level the finer its bore is; (3) to stand above the general level in the tube where it approaches the sides (as in fig. 1, which is drawn on a greatly exaggerated scale), so that its upper surface in the tube is curved and concave. When a similar tube is plunged into a liquid incapable of wetting it, such as mercury, phenomena of a precisely opposite nature are presented. The liquid stands in the tube below



Fig. 1.

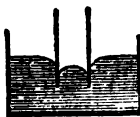


Fig. 2.

the level of its surface in the vessel, and with plane upper surfaces. These are the leading phenomena to be explained by what is called C. A., the tubes with fine hair-like bores being called capillary tubes, from Lat. *capillus*, a hair. The phenomena, however, though connected by name with such tubes, are not dependent on them, but may be produced without their intervention by any contrivance which gives room for the so-called capillary action. For instance, if two plates of glass with parallel faces be placed together with two of their edges in contact, and the two opposite be separated a very little by a fine wedge; and then if they be put standing with their common edge

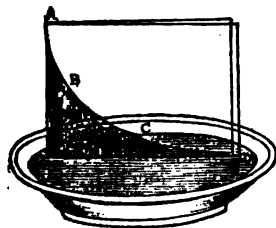


Fig. 3.

vertical in a trough (fig. 3), containing a little colored fluid capable of wetting the glass, the fluid will rise between the plates, the height attained at any point being inversely as the distance between the plates at that point, so that its upper surface will be a curve of the kind known as the hyperbola — being highest near the common edge, and lowest near the edges separated by the wedge. If the same apparatus be placed in a trough containing mercury, the mercury will be depressed between the plates till its upper surface forms a hyperbola convex to the zenith.

To understand the peculiar action producing these phenomena, it must be kept in view that the surface of a fluid at rest under gravity is a horizontal plane (see HYDROSTATICS), and that this plane is maintained by gravity and the mutual attractions of the particles of the fluid mass. Suppose now a fluid at rest in a vessel to have a foreign body, such as a capillary tube, suddenly plunged into it, and separating, as by walls, a portion of the fluid from the rest. By cohesion (q.v.), the fluid particles inside the tube will be held on—drawn downwards—to the mass of the fluid, while by adhesion (q.v.) they will be drawn upwards towards the sides of the tube. By the ordinary action of gravity, as in tubes of a large size, the fluid will at once tend to rise in the tube to its level in the vessel. Whether it will succeed in doing so, or whether it will rise still higher, must depend on the adjustment of the forces of cohesion between the fluid particles and their

adhesion to the solid of the tube. The relation of these forces may be generally explained as follows: Let  $mm'$  (fig. 4) be the surface of the column,  $mn$ , of a liquid contained in a space,  $abb'a'$ , above or below the surface,  $nn'$ , of the external liquid. There being equilibrium between the liquid in the tube and in the vessel, any line of liquid particles may be taken and supposed to be detached from the rest and inclosed in a tube, without altering the forces exerted. Let the line included between the dotted lines be conceived so detached. The actions which the particles of the liquid in the tube exert on each other, or sustain from the sides of the tube, have no tendency to make the liquid move either up or down. But the column,  $mb$ , in the tube has some action exerted on it by the sides of the tube above the surface,  $mm'$ . Let  $A$ , depending on the force of adhesion, represent this upward action of the tube. The column is also attracted downwards by the detached column  $bc$ , i.e., by the liquid in the imaginary tube. Let  $C$ , depending on the force of cohesion, represent this downward action of the liquid. Also the part  $bc$  of the liquid is attracted upwards by the tube  $ab$  by the attraction which we have represented by  $A$ . Thus the liquid column is acted on by two upward actions  $=2A$ , and a downward action,  $C$ . The whole force acting on it, excluding gravity, is  $2A - C$ . Gravity would make the liquid rise to  $nn'$  at once, i.e., till it stood as high in the tube as in the vessel. Whether, then, it will rise above  $nn'$ , or be depressed below it, must depend on whether  $2A$  is greater than  $C$ , equal to it, or less than it. If  $2A = C$ , the liquid will stand in the tube at the level  $nn'$ , as if these forces did not act at all. If  $2A > C$ , then  $2A - C$  will be an upward force, and the column will be raised above the level  $nn'$ . If  $2A < C$ , then  $2A - C$  will be a downward force, and the column be depressed.

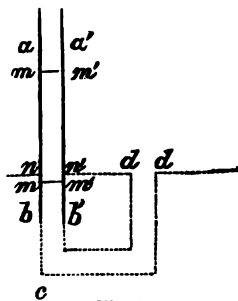


Fig. 4.

Regarding the forms of the upper surfaces of columns of liquid in capillary tubes, it can be demonstrated mathematically that the same relations of the forces of attraction and cohesion which determine the elevation or depression of the liquid column, determine also the form of its upper surface in the two cases of elevation and depression. In fact, the case of the elevated column resembles that of a cylinder of any very elastic substance (so elastic as to suffer change of form very readily under pressure), supported wholly by the rim at one of its ends; or, what is the same thing, by vertical forces acting in the lines composing its outer surface. Gravity draws down the concentric shells, of which the cylinder may be conceived to be composed, the further the more remote they are from the outermost, or that which is directly supported, the central rod being the most depressed. It would appear that the form of the surface has an important bearing on the cause of the production of the whole phenomena.

The third fact of observation—viz., that the liquid rises higher or is more depressed the finer the bore of the tube—is thus explained in the case of elevation: Since the action of adhesion is confined to the superficial layer of the fluid, and between the same substances is, *ceteris paribus*, constant in quantity for an equal extent of surface, the wider the tube the shorter must be the column sustained, as the contents of the column raised by cohesion increase more rapidly when the bore increases than the attracting surface. The column increases with the square of the diameter of the tube, while the attracting surface increases only with the diameter. The height, therefore, is inversely as the breadth of the tube. That the depression must increase as the bore of the tube diminishes, appears from reasoning similar to that employed in the case just discussed.

The degree of elevation varies with the nature of the fluid, the variation depending partly on the difference of cohesion between the particles of the fluid, and partly on the difference of adhesion between the fluid and glass. It is found that temperature affects these forces, so that the height diminishes as the temperature rises.

The depression of mercury in a fine glass tube makes it necessary to use a correction in reading off the height of the mercurial column in the barometer, which, owing to it, stands always a little lower than the height due to the atmospheric pressure. Experience, however, has shown that the capillary depression is nearly one half less in tubes which have had the mercury boiled within them than in unboiled tubes, as by the boiling a film of air, which in unboiled tubes adheres to the glass, is expelled. By widening the bore of the tube also, the error may be diminished so as to be neglected altogether. In a tube of  $\frac{1}{4}$  in. in diameter, in which the mercury has been boiled, the depression is 0.02 in., while with a similar tube of  $\frac{1}{4}$  in. diameter it is only 0.008. The depression of mercury, it is found, is slightly increased by an elevation of temperature. It may be mentioned that in reading off the level of mercury in any instrument, such as the barometer, the height should be taken from the convexity of the curve. If the liquid used in the instrument, however, wets the tube, the height should be taken from the concavity.

As already stated, the phenomena are not dependent on the intervention of tubes; any capillary cavity suffices to produce them. When two light bodies, such as two bits of cork, are left to float on water, near each other, they soon come together, moving at last with a rush. This is sometimes given as an example of the gravitation that draws

the planets to the sun; but it is really owing to this capillary action that we are considering. When the liquid wets the floating bodies, it rises slightly all round them, and this sustained liquid hangs as a weight on them on all sides. So long as it rises equally there is no motion; but when the bodies come near each other, the space between them becomes like part of the inside of a capillary tube, the water rises higher there than on the other sides, and the bodies move towards the sides that are most strongly pulled. When the floating bodies are not wetted by the liquid, the surface between the two bodies is depressed, as that of mercury is inside a glass tube, and the bodies descend, as it were, down the opposing slopes, and meet in the bottom of the hollow. If one of two bodies floating on water is smeared with oil so as to prevent the water from adhering, instead of coming together, the two will recede from each other, for reasons analogous to the above.

C. A. plays a most important part in nature in a great variety of ways. An instance of its employment by man is seen in the wicks of lamps and candles, which, being composed of fibrous materials, furnish hair-like channels by which the melted oil is elevated to the flame, and supplied as fast as it is consumed. C. A. influences the circulation of fluids in the porous tissues of animals, and it is the principal mode in which water, with the various substances which it holds in solution, is supplied to the roots of growing plants. It is through it that in summer droughts moisture is raised to the surface for the maintenance of vegetable life. C. A., too, affects many phenomena usually considered under the head DIFFUSION (q.v.) of fluids and gases. The reader, on referring to the article OSMOSE, will also see that it enters into the explanation of the phenomena known as exosmose and endosmose.

A familiar illustration of C. A. is furnished when one end of a towel happens to be left in a basin of water, while the other hangs over the side below the level of the water; the basin is soon emptied of its contents. It is important to observe that, although the towel will become wet, not a drop will flow from it, unless the outside end reach below the level of the water in the basin. In this respect C. A. resembles that of the siphon. And this shows the error of supposing that water may rise through the earth by C. A., and flow out as springs at a higher level than the source whence it is drawn.

Some very interesting experiments have been made by M. Poissenille (*Ann. de Chimie et de Phys.* III. xxi. 76) concerning the flow of liquids through capillary tubes, the results of which must here be stated. It appears that when the tube exceeds a certain length—which is greater as the bore increases—the following laws regulate the rate of efflux of the liquid, the efflux taking place under pressure: 1. The flow increases directly as the pressure, so that under double the pressure, double the amount is discharged in equal times. 2. In tubes of equal diameter, the quantities discharged vary inversely as the length of the tube. If a tube 2 in. long discharge 100 grains in 5 minutes, a tube 4 in. long will only discharge 50 grains. 3. In tubes of equal lengths, but different diameters, the flow is as the fourth power of the diameters. If one be  $\frac{1}{16}$  of an inch in bore, and the other  $\frac{1}{8}$ , the efflux from the larger will be 16 times as great as from the smaller. It is further found that the efflux varies with the nature of the liquid, the material of the tube not appearing to affect the result in any great degree. No law of the rate of efflux has yet been discovered, depending on the density, capillarity, or fluidity of the fluids.

It may be mentioned, in conclusion, that the tubes to be used in the experiments on capillarity should be perfectly clean and dry. If wetted, the film of moisture on the tube forms a new tube, and the action will be the same as with a tube of the substance forming the film. The reader should consult Miller's *Elements of Chemistry*, and J. Clerk Maxwell's *Theory of Heat*, where the phenomena are treated from a different point of view; the phrases "superficial energy" and "superficial tension" being substituted for "capillarity," and the hypothesis of molecular attraction being avoided.

**CAPISTRA'NO**, GIOVANNI DI, 1386-1456; an Italian lawyer who became a Franciscan monk and a powerful and popular preacher. In 1450, the pope sent him to Germany to preach against the Hussites, and also to forward the projected crusade against the Turks, who threatened to overrun Europe. He failed to start the crusade, but in the siege of Belgrade he led the inhabitants with the cross in his hand in three successful sorties. He was canonized, and his tomb became a popular resort for pilgrims.

**CAPITA**, DISTRIBUTION PER—i.e., distribution by heads, or by numbers, equally—occurs in the case of several claimants to the property of a deceased person, all severally claiming in their own right, in equal degree of kindred, and not under any right of representation. See INHERITANCE, SUCCESSION.

**CAPITAL** (Lat. *capitulum*, from *caput*, the head), the head of a column, pilaster, etc. Till the period of the renaissance, the head of a column in English was called chapter (chapter), its diminutive being chapitrell. See COLUMN.

**CAPITAL**, in fortification, is an imaginary line dividing a defense-work into two similar and equal parts. The C. of a bastion is a right line drawn from the point or salient angle to the middle of the gorge or entrance in the rear. The C. of a ravelin is a right line drawn from the re-entering angle of the counterscarp to the salient angle of the ravelin.

**CAPITAL**, in geography, the principal city or town of a country, that in which the sovereign usually resides, and where the legislature meets, and the chief legal courts are held.

**CAPITAL**, in its restricted sense is the money, or the property convertible into money, with which a trader carries on his business. Adam Smith defined it as "that part of a man's stock which he expects to convert into revenue." In the wider sense in which the term is employed in political economy, it indicates wealth set apart for purposes of production. In this latter acceptation it is sometimes regarded as the produce of past labor stored up and applied to the maintenance of future labor. This view, however, is not altogether correct, because any body of wealth may be employed as capital, and wealth is not always the result of labor. Thus if a diamond be accidentally found and then sold by its possessor and its produce applied to production, capital has come into existence without further labor than was incidental to the picking up of the stone. Capital is the result of abstinence; its existence implies that the owner of a certain amount of wealth abstains from the unprofitable consumption of it in order to consume productively, that is in such a way that it shall reproduce itself. But if it reproduce no more than itself there would be no incentive to the possessor to abstain from the consumption of it in his own personal gratification. Consequently he expects a reward for his self-denial. This reward is termed interest, being the remuneration for the use of capital and arising from the fact that the owner foregoes an immediate gratification or surrenders to another an essential agent of production. Wherever something is withheld from immediate consumption, and made to serve in future production, there is capital.

An important fact in the history of capital in modern civilized countries, is its constant increase and the consequent lowering of the rate of interest. Capital is with land and labor a requisite in the production of wealth, for without some wealth stored up for the subsistence of labor, a community could never advance beyond the hand-to-mouth stage of production. In the older school of economists there was no distinction made between the capitalist and the entrepreneur or employer of labor. According to these economists, the capitalist received profits, including not only interest on capital, but compensation for risk and wages of superintendence. Modern writers consider the share of the capitalist merely as the interest on his capital and limit the term profits to the remuneration of the entrepreneur. Belief in the so-called antagonism between labor and capital has been fostered by the writings of the old economists, who held the view that a certain fixed fund, called the wage fund, was set apart by certain economic forces for the payment of labor, and that during a definite period this fund could not be increased. From this it appeared that the interest of the laborer was of necessity opposed to that of his capitalist employer. The demolition of the old wage fund theory and the establishment of the doctrine that wages are paid out of product has done much to remove the misapprehension concerning this hostility between the two factors of production.

Capital may be divided into three elements, subsistence, tools and material, the first of course being the primary and most essential. Another division is into fixed and circulating capital, the former being that which is tied up in plant, that is, buildings, machinery, etc., and the latter being that portion which is turned over in the course of trade, as in the payment of wages and in the purchase of goods which are soon to be sold again. The concentration of a large amount of fixed capital is one of the reasons which obstructs the operation of the law that capital flows into its most productive channel, for it is obvious that wealth of this sort cannot be readily applied to other purposes and that its owner will prefer to go on selling for a time at a loss rather than to sacrifice his property by suddenly throwing his plant upon the market.

The concentration of capital in the hands of the few is a characteristic of the present industrial system. Its advantages are: First, the cheapening of production by preventing the multiplication of machines and other facilities for industry; Second, the extension of the division of labor, the large business being able to organize its forces and find a place for its workmen each according to his abilities more effectively than the small business; Third, the prevention of wasteful competition through diminution in the number of the controllers of capital. On the other hand it tends to reduce the conductor of a small business to the position of a subordinate in a large establishment, thus depriving him of that personal interest in management which may lead to the practice of economy at the same time that it encourages a spirit of independence. Again the possessor of a large capital is often able to crush out weak competitors and there is danger lest, after ridding himself of his rivals, he will secure a monopoly price for his product. Looking at these obvious tendencies of the capitalistic system, the socialist proposes that all capital should be socialized, that is to say, administered for the benefit of the community as a whole. They point to this very concentration of capital as rendering the change from individual to social ownership an easy step to take, for, the number of owners tending constantly to diminish, there are fewer individuals to be sacrificed through the introduction of a socialistic system. Of the different socialistic theories of capital the most important is that of Carl Marx, the author of the exhaustive work, *Das Kapital*. Marx finds no other source of value than labor, and holds that it is through the unscrupulous exploitation of labor that the capitalist employer reaps his so-called profits. The force of unrestricted competition obliges the laborer to accept what terms he can obtain from the capitalist, who through combination with his fellows seeks always

to depress wages to the limit at which they will barely maintain the requisite labor-power. If six hours' work will produce enough to maintain this labor-power and the capitalist can oblige the laborer to work for ten, the four hours' work constitutes what Marx calls surplus labor value which is stolen or "expropriated" by the capitalist. Arguing in this way, Marx concludes with the advice, "Expropriate the expropriators." Modern economists differ wholly from this view of the origin of value, maintaining that labor is not the sole source, but that value arises in a subjective sense from utility, and in an objective sense through the law of supply and demand. Thus denying Marx's premise, they cannot admit the conclusion that remuneration for the use of capital is so much stolen from the product of labor.

For further discussion bearing on this subject, see the articles, INTEREST, WAGES, PROFITS, and POLITICAL ECONOMY.

**CAPITAL ACCOUNT**—such is the name given to what concerns the capital stock of a railway or other public company. In authorizing a railway company—which we take as an example—parliament gives power to raise so much money by shares, and so much by borrowing. The amount that may be borrowed is equal to a third of the share stock, but it cannot be legally borrowed until at least one half of the share stock has been paid up. The form of borrowing is that of giving a mortgage on the whole property of the railway; the deed of mortgage, which is called a debenture, expresses the sum lent, the rate of interest that is to be paid, and the period for which the loan is given. See **DEBENTURE**. Unitedly, the money got for shares and by debentures forms the capital of the company; and, deposited in a bank, constitutes the *capital account*. On this fund the directors of the company make draughts to pay for the land, and all the works connected with the line, as also rails, locomotives, carriages, and, in short, everything involved in perfecting the railway up to the point of working. From the first, the holders of debentures receive interest, which must be paid in all circumstances, and the principal must be returned at the conclusion of the period for which it has been borrowed; at least, such are the ordinary obligations towards debenture holders. For the share part of the capital no return is made till the railway has been in operation, and drawings come in from the traffic.

As soon as traffic commences, there begins a new account called the *revenue account*, and which, kept in the same or a different bank, has no connection with the capital account. This, it may be judged, at once introduces a great complexity into the financial affairs of railways. In ordinary businesses, the profits of a concern are the free proceeds after deducting interest on capital and all expenses; and no attempt is made to keep two accounts, or to detach one part of the revenue from the other. As shareholders in a railway occupy the position of partners in a business, it might be expected that they would receive a divisible part of the proceeds equal to their respective claims after all expenses whatsoever had been paid. This is not the plan usually adopted. In general, the shareholders are only temporary partners; they buy shares in order to sell them at an advance. What they mainly look to is the rise on shares in the market, and therefore any process of management which can promote this important object meets their approval. Hence, the keeping of two accounts, two bank pass-books, and two books of checks. From the revenue account are drawn all payments for wages, rates, and taxes, coke, oil, and other petty furnishings, also repairs on carriages and locomotives, maintenance of way, and general management. What remains is the fund, whence is paid, first, the interest on debentures, and second, the dividend of the shareholders. From the C. A. are drawn all other outlays: first, the repayment of principal to debenture holders, and, second, the expenditure for new carriages and locomotives, new rails, and other substantial repairs upon and additions to the plant. As all railway traffic exceeds the expectations formed respecting it, the demands on the C. A. for fresh additions of one kind or other become exceedingly onerous. Were the shareholders to look to ultimate advantages, they would sanction the payment for permanent improvements out of the current revenue; but, as has been stated, shareholders for the most part care nothing for the remote and contingent prosperity of the undertaking, and will not or cannot make a corresponding sacrifice. Greatly diminished by primary outlay, and now operated upon for all sorts of additions and improvements, the C. A. is at length exhausted, and new powers have to be got from parliament to create new shares and new debentures, and which shares are only taken up by being guaranteed a preferable claim on the funds of the company. Where a large extension of traffic must be provided for, the creation of fresh capital is indispensable and legitimate; but it is equally open to remark that the C. A., as usually conducted, affords the means of enormously increasing the company's obligations, and is, in fact, an expedient to give good dividends to present holders of stock at the cost of their successors. Perceiving what must be the consequences, those among the proprietary of the small and more prudently managed railways who look to permanent investment, lose no opportunity to urge "that the C. A. shall be closed, and the whole expenditure of the company, including the payment of dividends and interests, be taken from revenue." Objections are raised to these remonstrances, sometimes on plausible, sometimes on sufficiently valid, grounds;



and it may be said that in remarkably few cases have railway companies been able, or been disposed, to close their capital account. See RAILWAYS (Legislation and Management).

**CAPITAL FELONIES.** See CAPITAL PUNISHMENT; FELONY

**CAPITAL PUNISHMENT** in criminal jurisprudence is the punishment of death. It is called *capital* punishment because the head (Lat. *caput*), from being the most vital, is usually that part of the body which is acted on. This applies especially to beheading and hanging; but almost all modes of depriving a criminal of life appear to have in view the peculiar vulnerability, and, at the same time, vitality of the head. This extreme penalty, notwithstanding the practice of the world from the remotest times down to the present day, has frequently been reprobated by philosophers and philanthropists, who have even gone so far as to deny the right so to punish to any earthly power. The weight of authority, however, appears in favor of capital punishment. Mr. Bentham, one of the most reasonable and discriminating authorities on the subject, in his well-known and valuable treatise, says that the idea of C. P. would naturally suggest itself in the infancy of a state. When any one had committed an offense, and disturbed the peace of society, the question would then first arise: "How shall we prevent these things?" and the answer most likely to occur to a set of barbarians would be: "Extirpate the offender, and give yourself no further trouble about him." And in conformity with this view of the matter, he alludes in a note to the case of the Hottentots, who have no fixed laws to direct them in the distribution of justice, and consequently, when an offense has been committed, there is no form of trial, or proportion of punishments to offenses; but the kraal (village) is called together, the delinquent is placed in the midst, and, without further ceremony, demolished with their clubs, the chief striking the first blow. The marquis Beccaria, in his remarkable *Essay on Crimes and Punishments*, strongly argues against the capital sentence being carried out in any case, denying the right, in fact, of government so to punish, and maintaining, besides, that it is a less efficacious method of deterring others, than the continued example of a living culprit condemned, by laboring as a slave, to repair the injury he has done to society. Bentham, on the contrary, holds that death is regarded by most men as the greatest of all evils; and that especially among those who are attached to life by the ties of reputation, affection, enjoyment, hope, or fear, it appears to be a more efficacious punishment than any other. On the question of right, Beccaria is still more pointedly refuted by sir Samuel Romilly, who observed: "Beccaria and his disciples confess that it is not the greatest of evils, and recommend other punishments as being more severe and effectual, forgetting, undoubtedly, that if human tribunals have a right to inflict a severer punishment than death, they must have a right to inflict death itself" (*Memoirs*, vol. iii. p. 278). It is not a little interesting to know that such was the opinion of one who did so much as a statesman to mitigate the severity of the criminal law.

Against C. P. arguments are often urged from Scripture, based on the general principle of Christian charity. To these it is replied that they proceed on a misapprehension and misapplication of the principle; and reference is confidently made to the Old Testament as sufficiently exhibiting the mind of the great Lawgiver in regard to this matter.

Death was, in former times in England, the ordinary punishment for all felonies, and the certain doom of those who could not avail themselves of *benefit of clergy* (q.v.), i.e., the common law inflicted death on every felon *who could not read*, and the law implied that punishment, where a statute made any new offense felony. On the other hand, the numerous acts of parliament creating felonies without benefit of clergy, show that the statute law was still more sanguinary, so that of the 160 offenses referred to by Blackstone as punishable with death, four fifths had been made so during the reign of the first three Georges. That some idea may be formed of such Draconian justice as was then established, we may mention the following as among the offenses which involved sentence of death: sterling in a dwelling house to the amount of 40s.; stealing privately in a shop goods of the value of 5s.; counterfeiting the stamps that were used for the sale of *perfumery*; and doing the same with the stamps used for the certificates for *hair powder*. Thanks, however, to the exertions of sir Samuel Romilly, the inhumanity and impolicy of such a state of the criminal code gave way, towards the end of the reign of George III., to a course of legislation which has reduced the application of death as a punishment within its present humane limits. Practically, indeed, it is only in the case of treason and murder that the capital sentence is ever pronounced; and even then, it is not always carried out, for the crown reserves to itself and exercises a right of review which frequently leads to such a change in the convict's fate as at least spares his life. This discretionary control on the part of the executive is essential in the present state of the law, which affords no means for a judicial appeal on the merits; for the very nature of the punishment, when finally executed, precludes the idea of all benefit to the sufferer, should the verdict of the jury afterwards turn out erroneous, and the innocence, instead of the guilt, of the accused be established. The law as it stands, indeed, allows a capital sentence to be reversed if technical error can be shown on the

face of the judgment or other matter of record—but what avails that, after the sentence has been executed.

With respect to the mode of executing C. P., we need not detain the reader by any account of the obsolete cruelties and tortures of former times. It may suffice to state that *hanging* and *beheading* are the two methods which now, for the most part, are practiced in the different European states—indeed, with the exception of Spain, by all. In the last country, the death of the culprit is instantaneously caused by the *garrotte* (q.v.). In England, Scotland, and Ireland, and in all the dependencies of the crown, the convict is hanged; while in France he is decapitated by the *guillotine* (q.v.), an instrument which an old Scotch machine called the *maiden* (q.v.), and used for the same purpose, very much resembled. In most of the German states, beheading is the mode of execution adopted; but in Austria, criminals convicted of capital offenses are hanged, as in England. See EXECUTION, MILITARY AND NAVAL.

In Holland there have been no executions since 1860, and C. P. was totally abolished in 1870. In Roumania it was abolished in 1864, and Portugal has adopted the same course. In Belgium the punishment of death is practically abolished, and no execution has taken place since 1868. Switzerland abolished C. P. in 1874, but murders increased, and in 1879 the cantons recovered by law the right of re-establishing it in their respective territories. It remains, however, totally abolished in 15 cantons. In Austria, during the period 1870–79, of the 806 persons sentenced to death, only 16 were executed. In Sweden during the same period only 8 out of 32 sentenced were executed; in Denmark only one out of 94; in Bavaria, out of 249 committed for murder, only 7 were executed. In North Germany, during the period 1869–78, 1801 persons were convicted of homicidal crime, and 484 sentenced, but only one was executed—Hödel, who attempted the assassination of the emperor William. From these instances it will be seen that in many European countries in which the extreme penalty is still enforced, the law has been practically abrogated by the marked growth of more humanitarian sentiments. See ELECTRICITY, DEATH CURRENT OF.

In our own country, capital punishment under the laws of the United States may be inflicted for treason, murder, arson, rape, piracy, robbery of the mails with jeopardy to the lives of persons in charge, rescue of a convict going to execution, burning a vessel of war, and corruptly destroying a private vessel. Until within a few years C. P. was the rule for the highest crimes in all the states, but it was abolished in Wisconsin and in Maine in 1874, and had been about that time abolished in Iowa; but in the latter state it was restored in 1878, the argument showing from the record that during its abolition crimes of violence had largely increased. Under the present law, a year must intervene between the sentence and execution, and the term may be further extended by reprieve. It was abolished in Michigan, Rhode Island, and New York also, but the last-named state was compelled to restore it, and in 1888 passed a law substituting death by electricity for hanging, a measure likely to be adopted by other states. By this method, the electric current, which must approximately equal in strength the currents used for the more powerful kinds of electric lights, is passed through the body of the criminal between suitable electrodes or wires attached to the head and back. It has been found that in this way death is produced instantaneously; probably too quickly for the nervous system to convey any impression of pain to the brain. This fact leaves room for the objection that punishment by this method would not be as potent to prevent crime as more severe measures. By the New York law no notice of the time of execution shall be publicly given except to persons invited or permitted to be present; said persons consisting of not more than 2 ministers or priests named by the criminal and 7 assistants or deputy sheriffs appointed by the agent and warden. Immediately after the execution a post-mortem examination shall be made by the physicians present at the execution. No religious services shall be held over the remains, except within the walls of the prison, and only the prison officers, the person conducting said service, and the immediate family and relatives of said deceased prisoner shall be present. No account of the details, beyond the statement that such convict was on the day in question duly executed, according to law, at the prison, shall be published in any newspaper. The first execution under this law, was that of William Kemmler, at Auburn Prison, Aug. 6, 1890.

As each state has jurisdiction over its own territory, the laws punishing crime differ in several respects. In many states, murder is by statute divided into different degrees, differing from each other by the malice and premeditation which accompany the act. In a few states, imprisonment for life is substituted for C. P. As regards the U. S. army, the concurrence of two-thirds of a general court-martial is required, and no sentence of death can be carried out until confirmed by the president, save in persons convicted in time of war, as spies, mutineers, deserters, or murderers. The effect of the abolition of the death penalty has not thus far supplied any very strong reasons for the stand of those who would abolish it altogether. Perhaps the most notable suspension of this punishment in all history was during the civil war in the United States, when no person was deliberately executed for what was held to be treason against the federal government, and the extreme penalty visited even upon the captured head of the confederate government was the loss of the political (but not the personal) rights of a citizen.

**CAPITALS** (*majuscula*), in contradistinction to small letters (*minuscula*), are the large letters employed in writing and printing to help the eye, to relieve the uniformity of the page, to increase the facility of keeping and finding the place, to mark the beginnings of sentences, proper names, etc. Among the ancients, and during the earlier part of the middle ages, no distinction of C. and small letters was known; and after the practice had been introduced of beginning books and chapters with great letters often adorned or illustrated with much artistic ability, it was long before C. were employed in such a way as could afford much real advantage to the reader. At the present day, they are universally employed, even in the printing of Greek and Latin books. Considerable diversity has existed at different times with regard to the employment of them, the books of the 17th and 18th c. exhibiting a much greater proportion of them than those of the present day. In German books, all substantives usually begin with a capital letter; in English and French books of the present day, they in general appear only at the beginnings of sentences and of proper names. Adjectives formed from proper names, as *English*, *French*, etc., are generally begun with a capital in English books, but not in French nor in German ones.

**CAPITANA' TA**, or **FOGGIA**, a province of Italy, the *Dauria* of the ancients, is bounded n. and e. by the Adriatic, and on the s.w. by the Apennines. It stretches along the Adriatic about 70 m. in a straight line, and its average breadth is about 45 m.; but its coast-line, measuring round the great promontory of Monte Gargano, which has been called "the spur of Italy," is fully 100 m., and its breadth between the extremity of that projection and the Apennines, 75 miles. Pop. '95, 408,371. The greater part of the surface is a sandy plain sloping from the Apennines to the Adriatic, and watered only by some inconsiderable streams. The rearing and feeding of cattle form the chief occupations of the inhabitants. Wheat, wine, and fruits of various kinds are produced in quantities sufficient to admit of exportation. There are important salt-works, quarries of alabaster, and potters' clay. Foggia is the chief town.

**CAPITATION**, from the Latin *caput*, a head, means something applicable to all persons, or to the people by the head. A tax levied on all persons, without reference to property or other incidents, is called a C. tax, and sometimes a poll tax. The former term was often used in France for the tax better known as the *taille*, although this offensive impost was not imposed on all alike, the nobility enjoying many exemptions from it.

**CAPITOL**, the fortress of ancient Rome, and site of the national sanctuary the temple of Jupiter, was situated on the *Mons Capitolinus*, the smallest but most famous of the seven hills on which Rome was built. The hill itself was first termed *Mons Saturninus*, afterwards *Mons Tarpeius* and *Rupes Tarpeia*, and after the foundation of the capitol, *Mons Capitolinus*, though a particular portion of it retained its ancient name of *Rupes Tarpeia*. It was steep and abrupt in almost every part, formed a natural fortress, and was strengthened here and there by towers. The C. was founded by Tarquinius Priscus, and completed by Tarquinius Superbus, who tasked the people to work at it. The whole mount had a circumference of about 800 paces. During the civil wars under Sulla, the temple was burned (according to Tacitus, by design), and after its restoration, destroyed during the Vitellian riots. It was rebuilt by Vespasian, after whose death it was again destroyed by fire, but was once more restored by Domitian, who instituted here the capitoline games. Domitian's structure lasted to a late period of the empire. Regarding the site of the C., there has been great dispute; the German scholars, for the most part, maintaining that it occupied the s.w. summit of the hill, and the Italians, the n.e. The latter situation has the weight of probabilities in its favor. From that portion of the mount named the Tarpeian rock, state criminals were thrown down. According to the description given by Dionysius of Halicarnassus, the temple of Jupiter, with its peristyle of columns, was 200 ft. long by 185 ft. wide, and was divided into three cellæ, separated from each other by walls, and respectively dedicated to Jupiter, Juno, and Minerva. In the spacious portico, the people feasted on triumphal occasions. The scanty ruins remaining in the present day consist of a sub-structure of peperino or volcanic tufa, a wall of the same materials, and some remains of the a. front, together with a portion of the great flight of steps leading to the temple.

The modern C. (*Campidoglio*), built on the site, and partly on the foundation of the ancient C., was designed by Michael Angelo, but is one of his inferior works. The main entrance, however, presents a splendid view. It is used as a kind of hotel-de-ville and museum.

Besides the great temple of Jupiter, the most important structures on the Capitoline Mount were the temple of Jupiter Tonans, built by the emperor Augustus; and the magnificent *Tabularium*, containing archives, and, in connection with the *Ærarium* ("Treasury"), serving as a library and place for lectures, etc. The remains of this structure, built by Quintus Catulus, 78 B.C., have still an imposing aspect.—For the U. S. Capitol, see WASHINGTON.

**CAPITOLINE GAMES**, instituted 387 B.C., in commemoration of the preservation of the Roman capitol (fortress) from the Gauls. Nero revised them, modeled them after

the Olympian games, and proposed to institute a new computation of time founded upon the 5-year period intervening between the celebrations.

**CAPITOLINE HILL.** See **CAPITOL**.

**CAPITOLINUS, JULIUS**, a Latin historian of the 3d c., who wrote the lives of several of the Roman emperors, and was one of the authors of the *Historia Augusta*.

**CAPITULARIES** (Lat. *capitularia*). *Capitularium* is literally a book divided into chapters; and the plural of the word was the name given to the laws issued by the kings of the first and second of the Frankish races, from Charles Martel downwards. These laws proceeded from the great assemblies of the king, nobles, and bishops, which formed the states of the kingdom, and, from their general character, were opposed to the laws issued for the separate states, which were called *leges*. They were divided into general and special C., according to the more or less general nature of the interests which they embraced, and the mode of their publication. They have by no means been all preserved. The most famous are those of Charlemagne and of St. Louis. In 827, abbot Angenius, of Fontenelles, made a collection of the C. of Charlemagne, and of his son, Louis le Débonnaire. Other collections were made by private persons, and, in 847, one by authority of the king, but they are all very imperfect and ill arranged. After Charles the Simple, in 922, no more C. were issued, and no similar laws or statutes exist from that period till the time of Louis le Gros, in 1100. The best collections are those of Baluze (Paris, 1677 and 1780), and of Pertz, in the *Monumenta Germanica*.

**CAPITULATION**, a treaty consisting of several specified conditions (Lat. *capitula*, heads). In the military sense of the word, a C. is a treaty of surrender to an enemy. When a place can no longer be defended, on account of failure of ammunition or provisions, or the progress made by the besieging-party, a white flag is commonly put up, as a sign that the besieged are willing to capitulate. According to the kind and degree of peril in which the fortress is placed, so are the terms which the governor may reasonably expect from his successful opponent. Sometimes the arms and military stores are left to the besieged, but more frequently they are taken by the besiegers, except articles of private property belonging to the officers and men. The "honors of war," the marching out with drums beating and colors flying, are usually stipulated for, unless the conqueror exacts very severe terms. The mildest form of a C. is a *convention*, agreed to when the conqueror is not strong enough to insist on stringent conditions.

**CAP'NOMANCY**, a word formed from the Greek *capnos*, smoke, and *manteia*, divination. The ancients practiced it in two different ways—either they threw grains of jasmine or poppy on the burning coals, and watched the motions and the density of the smoke that rose from them, or they watched the smoke of sacrifices. This latter kind of C. was most generally employed, and that to which the greatest importance was attached. If the smoke was thin, and ascended in a right line, instead of being blown back by the breeze, or spreading over the altar, the augury was good. It was also believed that the inhalation of the smoke rising from the victims or from the fire which consumed them, gifted the priests with prophetic inspiration.

**CAPOBIANCO**, the founder and leader of the Carbonari (q.v.), a secret society formed, in 1808-10, in Italy to oppose the rule of Murat and of Ferdinand. Very little is known of him, except that he was treacherously arrested and put to death.

**CAPO DI MONTE** was a china manufactory, situated near Naples, Italy. Articles were made in colored relief. It was in operation from 1736 to 1821. The marks and moulds are now used at La Doccia, near Florence. See **DOCCIA**.

**CAPO D'ISTRIA**, a fortified seaport t. of Austria, situated on a rocky island in the gulf of Trieste, 8 m. s.w. of the city of Trieste. It is capital of the circle of Istria, with the peninsula of which it is connected by a stone causeway. Pop. about 8200.

**CAPO D'ISTRIA**, or **CAPO D'ISTRIAS**, JOHN ANTHONY, Count, president of the Greek republic from 1827 to 1831, was b. in Corfu, 1776. His family had been settled in that island since the 14th c., but originally came from the Illyrian town of Capo d'Istria (q.v.), near Trieste. He devoted himself to political life, and after having held a high position in the Ionian islands, he entered the diplomatic service of Russia. Here his diplomacy tended to the separation of Greece from Turkey. In 1827, he was elected president of Greece; and in Jan., 1828, he landed in Greece, and entered upon the duties of his office. He was a patriot, a philanthropist, and an able diplomatist, but by no means equal to the task which he now undertook. Everything was in disorder; the people had been long enslaved, and knew not how to use their freedom; and the president had been so much imbued with the centralizing principles prevalent at the courts which he had frequented, that some of his measures, especially that restricting the liberty of the press, gave offense to the most temperate of the enlightened lovers of civil liberty. His career was cut short by his assassination in a church at Nauplia on Oct. 9, 1831. The assassins were relatives of Peter Mauromichali, against whom he was urging on a prosecution, for alleged offenses against the state.

**CAP OF MAINTENANCE**, or **DIGNITY**, is a cap worn by noble and royal personages on certain state occasions. Such a cap was sent by pope Julius II. to king Henry VIII., for writing his book against Martin Luther.

**CAPONIERE**, or **CAPONNIERE**, in fortification, is a parapet 8 or 10 ft. high, with a superior slope, terminating in a small glacis. It is placed in the ditch of a fortified place, to cover or screen the defenders while passing from one defense-work to another. Generally, it has a banquette, on which musketeers may stand to fire over the crest. If there is a passage between two such parapets, it is a *full* caponniere; if on one side only, a *half* caponniere. See **CASEMATE**.

**CAPPA**, CARLO ALBERTO, musician, born in Alessandria, Sardinia, 1884. His father was an officer in the army, and this gave the son the privilege of entering the Royal Academy of Music at Asti, when only ten years of age. At the age of fifteen, he became first trombone in a military band, and after six years, joined the band of the U. S. frigate *Congress*, where he soon became leader. In 1858, he went to New York; joined the Shelton band; followed its leader, Grafulla, when he became leader of the 7th regiment band in 1860, and became his successor in 1881. He conducted many concerts in different cities; and d. in 1893.

**CAPOTE** (Fr. *cape*, a cape, cloak), is a long cloak with a hood, worn in the s. of Europe by soldiers, sailors, and travelers. In the Levant, the capote is an outer garment, worn both by men and by women, and made either of rough cloth or of skins, retaining their hair. It is described as "a sort of white frock coat, without sleeves, and embroidered in bright colors down the seams.

**CAPPADO'GIA**, anciently a province, and subsequently a kingdom in the w. of Asia (in part the present Caramania). It was bounded by Lycaonia on the w., by Cilicia and Syria on the s., by Armenia on the e., and by Pontus on the north. During the time that it belonged to the Persian empire, however, it included Pontus, which was called Lesser Cappadocia. In 17 A.D., C. was erected into a separate province of the Roman empire by Tiberius.

**CAPPARID'EE**, or **CAPPARIDA'CEÆ**, a natural order of exogenous plants, allied to *crucifera*, and including about 850 known species, herbaceous plants, shrubs, and trees, mostly natives of tropical and sub-tropical countries. The leaves are generally alternate, stalked, undivided, or palmate; the flowers solitary or clustered; the calyx of four sepals, sometimes cohering in a tube; the corolla of four, or sometimes eight petals, sometimes wanting, the stamens generally a multiple of four, or indefinitely numerous, placed on a hemispherical or elongated disk; the ovary one-celled, the style thread-like or wanting; the ovules curved; the fruit either dry and pod-like (tribe *cleomeæ*), or a berry (tribe *capparææ*). To this order belongs the well-known caper-bush. See **CAPERS**.

**CAFFE**, NEWCOME, 1782-1800; an English dissenting clergyman who studied under Doddridge, and adhered to Dr. Priestley's Unitarian doctrine. He was pastor of a dissenting congregation in York for more than 40 years, and was one of the ablest and most eloquent of his denomination. He was also the author of a number of devotional works.

**CAPPEL**, a village of Switzerland, in the canton of Zurich, and 10 m. s.s.w. of the city of that name. It is interesting as the place where the great reformer Zwinglius was killed in a conflict with troops of the Roman Catholic cantons, Oct., 1531. A monument has been erected here to his memory.

**CAPPEL**, a French family of scholars, theologians, and lawyers. GUILLAUME, in 1491, had the boldness to refuse the payment of tithes demanded by the pope. JACQUES, his son, was councillor of state under Francis I., and in 1537 made a powerful speech against Charles V. LOUIS, son of Jacques, was professor of theology at Sedan, and more than once risked his life in the cause of Protestantism. One of his acts was to present to Charles IX. the confession of faith drawn up by the Protestants of Paris. Two others, a son and a grandson of Jacques, were distinguished, one in the law, and the other in theology, history, philology, and antiquities. Both these were named JACQUES; and the younger was the father of LOUIS, the most celebrated member of the family (1585-1658), who studied at Sedan, Oxford, and Saumur, and was professor of Hebrew at the latter place. He devoted much attention to the text of the Scriptures. On the revocation of the edict of Nantes, Louis fled to England where he died. His life was published by his nephew, JAMES, who at only 19 years of age was professor of Hebrew at Saumur.

**CAPRA'RA**, GIOVANNI BATTISTA, 1738-1810; an Italian statesman and bishop, who served as papal legate or nuncio at Cologne, Lucerne, Vienna, and to the French republic in 1801, where he arranged the concordat of that year, re-establishing the Roman Catholic form of worship. In May, 1805, he crowned Napoleon as king of Italy.

**CAPRE'RA**, or **CABRERA**, one of a group of small islands called the Buccinari islands, in the strait of Bonifacio, to the e. of the n. point of Sardinia (q.v.). They belong to the Italian province of Sassari. C. is separated from the coast of Sardinia by a strait of

little more than a mile in breadth, and by a similar narrow strait from the island of Maddalena, which lies to the west. Its greatest length, from n. to s., is about 6 m., and its breadth is from 2 to 3 miles. Like Maddalena and the rest of the Buccinari isles, and the neighboring coast of Sardinia, C. is rocky, bare, and unfertile. It has no streams, and is in few places adapted either for the pasture of cattle or for the plow. In former times, it was the abode only of wild goats—whence its name (Lat. and Ital. *capra*, a goat)—and rabbits, and was occasionally visited by goat-herds and fishermen. It has of late years acquired celebrity as the ordinary residence of Garibaldi, who acquired a property and built a house here in 1854. He dwelt here from 1854 to 1858, and again made it his abode in the autumn of 1860. It was to C. that he was sent in Sept., 1867, in honorable banishment by the Italian government, after having been taken prisoner at Asinulunga, in consequence of his design of entering the Roman territory to promote an insurrection and overthrow the papal government, and in C. he had his residence when not in Rome, till his death in 1882.

**CAPRI** (the ancient *Caprea*), a charming island in the Mediterranean, at the entrance of the bay of Naples, about 8 m. from cape Campanella, and 20 m. s. of the city of Naples. On its small area of about 11 m. in circumference, it displays a rich variety of beautiful scenery, ruins of antiquity, and points of historical interest, and contains a pop. of (1890) 6,000 souls. The island is composed of two mountain masses, separated from each other by a depression like the seat of a saddle. That on the w., called monte Solaro, which is the highest and largest, has an elevation of about 1900 feet. The eastern part does not attain a height of more than 800 ft. above the sea. At the base of the eastern mountain is situated the town of C., built on a shelving rock, and guarded by walls, gates, and draw-bridges, with a cathedral, and a pop., including the district, of about 4,000. It commands a beautiful prospect, and communicates with the little town of Anacapri, on the western table-land, by a flight of 585 rude steps, cut in the face of the rock. There are only two safe landing-places on the island, and these are at C. and near it. C. was a celebrated place, in the times of Augustus and Tiberius. Ruins are still found of Roman baths and aqueducts, and of the 12 grand villas or palaces built in honor of the 12 chief deities by the emperor Tiberius, who passed the last 10 years of his life here in the practice of the grossest licentiousness and cruelty. The inhabitants now consist of fishermen, sailors, and a few traders, with vine-dressers and cultivators of olives in Anacapri. Wherever a tree can be planted, the hopeful and industrious people have prepared for it a soil by persevering toil in terrace-culture. Delicious quails, which in vast numbers alight on the island during their migrations to and from Africa, in spring and autumn, are taken in nets, and form an important item in the resources of Capri. To the w. of the town of C. is situated the *Grotta Azzurra* (blue grotto), a remarkable cavern, entered from the sea by a narrow opening not more than 8 ft. high. Inside, however, it is found to be of magnificent proportions, and of marvelous beauty, the gorgeous coloring being said to be produced by the reflection and refraction of the sun's rays through the water. Elliptical in form, it has a length of 165 ft., a breadth of 100 in the widest part, and a height of 40 in the loftiest, with 48 ft. of water beneath.

**CAPRICCIO** (Ital.), in art, is applied to a picture or other work which designedly violates the ordinary rules of composition. Foliated ornaments, with cupids or other figures appearing in them in situations not strictly natural, are capriccios.

**CAPRICCIO**, in music, is a species of free composition, without being subject to rule as to form or figure. Locatelli, at the beginning of the 18th c., composed capriccios for the violin. The most celebrated C. of modern times is Mendelssohn's B minor C. for pianoforte and orchestra.

**CAPRICORNUS**, the *Goat*, a southern constellation, and the tenth sign of the zodiac (q. v.); denoted by the sign ♈, representing the crooked horns of a goat. It is usually represented on the globe as having the forepart of a goat, but the hinder part of a fish. It is one of the least striking of the zodiacal constellations. It was, however, celebrated among the ancients, who regarded it as the harbinger of good-fortune, and as marking the southern tropic or winter solstice, wherefore they called it the "Southern Gate of the Sun." It contains no large stars, the two largest, which are situated in the horns, being only of the third magnitude. Neither of these rises above the horizon in the latitude of Gt. Britain. See **TROPICS**.

**CAPRIDÆ**, a family of ruminant quadrupeds, which, as defined by some naturalists, may be described as the *sheep and goat* family, including the Linnæan genera *ovis* (sheep, q. v.) and *capra* (goat, q. v.); but which is extended by others to include antelopes, their persistent horns being regarded as the great distinction between them and the *cervidæ* or deer family. In the more restricted sense, the name designates a very natural family, yet differing from the *bovidæ* or ox family more in general appearance than in other characters; whilst links of connection with the antelopes are not wanting, a very remarkable one being found in the prong-horn of America.

**CAPRIFICATION**, a method which has long been employed in the Levant for securing and hastening the maturation of figs, and which consists in suspending fruit-bearing branches of the wild fig above or beside those of the cultivated tree. The notion once

entertained, that this practice is analogous to that by which the fecundation of the female palm-tree is secured, is inconsistent with the now well-known fact, that the fig has both male and female flowers within its own receptacle; and it is therefore supposed that the effects of *C.* may result from the agency of a species of insect, of which the eggs have been deposited in the early wild figs, and which may promote fecundation by entering the receptacle of the cultivated fig, or perhaps by puncturing it may cause it to ripen sooner. In hope of a similar advantage, some French and English cultivators have inserted into figs straws dipped in olive-oil. But *C.* is scarcely practiced in the western parts of Europe, and has even been discontinued as unnecessary in some parts of the east where it once prevailed. See FECUNDATION.

**CAPRIFOLIA CÆ**, a natural order of exogenous plants, consisting of shrubs and herbaceous plants, which have opposite leaves without stipules, and flowers disposed in corymbs, in heads, or in whorls. The calyx is 4 to 5 cleft; the corolla monopetalous, tubular, or wheel-shaped, sometimes irregular. The stamens are adherent to the corolla at its base, and alternate with its lobes. The ovary is free, 1 to 5 celled. The fruit is generally a berry, sometimes dry, but not splitting open when ripe. The order is very nearly related to *cinchonaceæ*, differing chiefly in the want of stipules. More than 200 species are known, chiefly natives of the temperate and colder parts of the northern hemisphere. To this order belong the honeysuckle, elder, viburnum, and snowberry.

**CAPRIMULGIDÆ**, a family of birds, of the order *insectores*, and tribe *fissirostræ*, nearly allied to the *hirundinidæ* or swallow tribe, but differing from them in the still greater width of gape, and in having long stiff bristles at the base of the bill. They are insectivorous birds. They have very long wings, short legs, and toes united at the base by a membrane. The European goatsucker may be said to be the type of the family,

**CAPRIVI DE CAPRARA DE MONTECUCULLI**, GEORGE LEO VON, chancellor of Germany, was born in Berlin in 1831. In his eighteenth year he volunteered in the Kaiser Franz grenadiers, and during the campaign in Bohemia in 1866 was made a major and put on the general's staff of the first army corps. He distinguished himself during the Franco-Prussian war, and as chief of staff of the 10th army corps served brilliantly at Metz and Orleans, and in the following Loire campaign. In 1882 he was appointed commander of the 30th infantry corps at Metz; in March, 1883, was selected by Bismarck to succeed Admiral Stosch as chief of the ministry of marine, greatly to the dissatisfaction of the officers of the navy. He gave much attention to the perfecting of torpedoes and torpedo-boats, and arranged a plan for the more rapid mobilization of the war vessels. In 1889 he resigned and was made commander of the 10th army corps, stationed in Hanover; and received the order of the Black Eagle. In March, 1890, he was made chancellor of the empire, and president of the Prussian council, succeeding Bismarck (q.v.). In July, 1890, he arranged with Lord Salisbury, representing England, the so-called Anglo-German partition of East Africa, for which see GERMANY. He resigned the presidency of the council in 1892, and the chancellorship in 1894.

**CAPROTIC**, **CAPRYLIC**, and **CAPRIC ACIDS** are represented by the formulæ  $C_6H_{12}O_4$ ,  $C_8H_{16}O_4$ , and  $C_{10}H_{20}O_4$ , and are members of the acetic or fatty-acid series. They derive their names from *capra*, a goat, in consequence of their more or less resembling in smell the odor of that animal. They may all be obtained from butter by pressing out the portion which remains liquid at 60°, saponifying this oil, and distilling the soap which is thus formed with sulphuric acid. The liquid which passes over contains these three acids, together with butyric acid.

**CAPS AND HATS**, names of political parties in Sweden in the early part of the 18th c., the former favoring and the latter opposing the alliance with Russia.

**CAPSIUM**, a genus of plants of the natural order *solanaceæ*, having a wheel-shaped corolla, projecting and converging stamens, and a dry berry. The species are all of a shrubby, bushy appearance, and have more or less woody stems, although they are annual or biennial plants. The number of species is very uncertain, some botanists distinguishing many, whilst others regard them as mere varieties of a few. They are natives of the warm parts of America and of Asia, have simple leaves, and rather inconspicuous flowers, and some of them are in very general cultivation in tropical and sub-tropical countries for their fruit, which is extremely pungent and stimulant, and is employed in sauces, mixed pickles, etc., often under its Mexican name of *chillies*; and when dried and ground forms the spice called *Cayenne pepper*. As a condiment it improves the flavor of food, aids digestion, and prevents flatulence. In tropical countries, it counteracts the enervating influence of external heat. In medicine, it is used as a stimulant, rubefacient, and vesicant; is often administered in combination with cinchona; and is particularly valuable both internally administered and as a gargle; not only in relaxed conditions of the throat, but in some of those diseases in which the throat is most dangerously affected. As a medicine, *C.* is administered in *pills*, mixed with bread; in the form of *incture*, obtained by digesting the bruised *C.* in alcohol, or of an *infusion*, procured by digestion in water, with varying proportions of salt and vinegar. A gargle of *C.* is prepared by infusing it in water, along with candy-sugar and vinegar, and thereafter adding a little infusion of roses. It has no narcotic properties. It owes its power chiefly to *capsicine*. The fruits of the different species of *C.* differ in form, being round, oval, conical, heart-shaped, etc.; they vary from half an inch to 4 in. in length, and are sometimes of a bright red, sometimes of a yellow color. In all, the dry berry has an inflated appear-

ance, and contains numerous whitish flattened seeds, which are even more pungent than the leathery epidermis, or the spongy pulp. Cayenne pepper consists chiefly of the ground seeds. *C. annuum*, sometimes called common C., or Chilly pepper, is perhaps the most common species in cultivation; and in the southern parts of Britain, it raised on a hot-bed as a tender annual, it produces fruit in the open border. There are several varieties of it. *C. frutescens*, sometimes called goat pepper, and *C. baccatum*, sometimes called bird pepper, have great pungency, and the former is generally described as the true Cayenne pepper. *C. cerasiforme*, with a small cherry-like fruit, and therefore called cherry pepper, and *C. grossum*, with a large, oblong, or ovate fruit, known as bell pepper, are frequently cultivated.—The fruit is used either ripe or unripe, except for making Cayenne pepper, for which dried and ground fruit is employed. See *illus.*, *TEA, COFFEE, ETC.*, vol. XIV.

**CAPSTAN**, on shipboard, is a ponderous mass of timber, whose uses are to heave the anchor, hoist up masts and guns, take in and discharge cargo, etc. It has very firm supports on the deck underneath it. It comprises a *barrel*, round which a rope or a chain coils; *whelps*, or pieces of timber, which enlarge the diameter without greatly increasing the weight; the *drum-head*, a polygonal flat piece of timber at the top, pierced laterally with holes; the *step*, or lowest part, which rests upon and is bolted to the beams; the *saucer*, an iron socket let into the top of the step; the *pivot* or *spindle*, which, resting on the saucer, forms the axis around which the C. turns; the *pawls*, short bars of iron, to prevent the reaction of the C.; *bars*, which enter the holes, and are the levers for enabling the sailors to work the C.; *pins*, placed vertically through the drum-head, for temporarily retaining the bars in their places; and the *shifter*, a rope connecting the outer ends of the bars. Among many improvements made in the arrangement and action of capstans is Wardill's, for increasing the bite or holding of a chain-cable around the circumference. In large vessels they are generally worked by steam.

**CAPSULE**, in botany, a dry fruit, *syncarpous* (or formed of several carpels united together into one), and opening either by valves, as in the fox-glove, primrose, and rhododendron, or by pores near the summit, which some regard as a sort of valves, and of which beautiful examples may be seen in the poppy and snapdragon. Capsules are either one-celled or many-celled. The *pyxidium* is a variety of C., which opens as if cut around near the summit, presenting the appearance of a cup with a lid, of which a very beautiful example may be seen in the *anagallis*, or pimpernel; and another in the great woody fruit of the different species of *lecynthis* and other *lecynthidaceae*.

**CAPSULE** (*in medicine*), a thin membranous covering, casing, or envelope, like a pouch or bag, containing some part or organ; the capsule of the kidney is a smooth, fibrous membrane closely investing the kidney and forming its outer coat; the capsule of the lens is the transparent, elastic, brittle, and structureless membrane of the eye. The word has been also extensively used for a small, gelatinous case or envelope in which *nauseous* medicines are enclosed, to aid in the swallowing.

**CAPTAIN** means a head or leader and is a title found in almost every language for the chief of a small number of men. In the United States any one in charge of a craft, be she skiff or battle-ship, is as a rule called captain. In the army a captain ranks next above a first-lieutenant and below a major. When on duty with troops he commands a company, troop or battery. A captain present for duty with his command is responsible for its appearance, discipline, and efficiency. He is accountable for the care and preservation of the articles of public property that constitute its equipment; for the proper performance of duties connected with the subsistence, pay, and clothing of its members, and for the correct keeping and rendition of all company accounts, reports, and returns. The captain recommends the non-commissioned officers of the company who are appointed by the colonel, and from the sergeants he selects the first sergeant. In camp or barracks the captain maintains a careful supervision over the cooking and messing of his men, and is responsible for the camp and garrison equipage, and the arms and clothing of his company.

A captain in the navy ranks next above a commander and below a commodore, and ranks with a colonel in the army. There are 45 captains on the navy list on active duty, and they are promoted to the commodore's list in regular sequence whenever a vacancy occurs. They command naval vessels of the first or second rates, act as fleet-captains or chief of staff, command navy yards or naval stations, act as members of boards, and are frequently chiefs of bureau at the navy department, in which event they have, while in office, the relative rank of commodore. They also perform the duties of the captain of the yard at a navy yard, a position next to that of the commandant. On board a flag-ship where there is but one cabin the captain is entitled to one-third the space, the flag officer having the other two-thirds. Upon taking command of a vessel, the captain must inform himself fully as to her condition and that of her engines and boilers, and also the qualifications of the officers under his command. He is responsible for the discipline and government of officers and men, and he cannot sail from the United States until the crew are properly stationed and, as far as possible, exercised at the different evolutions. He is to make careful and repeated trials of the vessel under sail and under steam in every variety of wind and weather, so as to inform himself thoroughly as to her capabilities. He is not allowed to use more than two-thirds boiler power, except in an



emergency, and he is to use the engines in the most economical and efficient manner possible. The health of the crew, the dryness and the proper ventilation of the vessel are to have his particular attention. He investigates offences and awards punishments, and sees that a correct register is kept of the same, and he is at all times responsible for the safe navigating, handling and general efficiency of his command.

**CAPTURE.** See PRIZE.

**CAPUA**, a fortified city of Italy, in the province of Caserta, beautifully situated in a rich plain, on the left bank of the Volturno, about 18 m. n. of the city of Naples, with which it is connected by railway. It is a military station of the first class, its defenses having been greatly extended and improved by Vauban. As it is the only fortress which guards the approach to Naples from the n., it was regarded as one of the keys of the former kingdom of that name. The only objects of interest in the city are the cathedral, with some splendid granite columns from ancient *Castellum*, upon whose site C. was built in the 9th c.; the church of the *Annunziata* with some bas-reliefs; and the arch of the *Piazza dei Giudici*, under which many ancient inscriptions still exist. Pop. about 13,500.

The ancient *Capua*, which enjoyed a reputation for wealth and population second only to Rome and Carthage, was situated about 2 m. s.e. of the present city, where its ruins are still to be seen, its site being occupied by the modern town of Santa Maria di Capua. C. was founded by the Etruscans, under the name of *Vulturnum*, as early, according to some authorities, as 800 B.C., and was the chief city of the twelve said to have been founded by them in this part of Italy. Its present name was derived from the Samnites, who captured it in 423 B.C. After the battle of Cannæ, 216 B.C., the popular party opened the gates to Hannibal, whose army was greatly enervated by its luxurious winter-quarters here. The Romans obtained possession of the city in 211 B.C. In the 5th c., A.D., C. was devastated by the Vandals under Genseric. It recovered its prosperity again to some extent, but it was totally destroyed by the Saracens in 840. The citizens, who had fled to the mountains, were induced by their bishop to return some 16 years later, and found the modern Capua. From the existing remains of the walls and fortifications of ancient C., it has been estimated that it had a circumference of 5 or 6 miles. It had seven gates. Among the Roman antiquities, one of the most remarkable is the amphitheater, built of bricks, and faced with white marble. Well-preserved arches, corridors, and seats for spectators, still remain. It is calculated to have been capable of holding 60,000 persons.

**CAPUCHINS**, a branch of the Franciscan order, whose rule is essentially the same as that of the friars minor, or Minorites. They were founded by Matthew da Bassi, a Franciscan of Ancora, and were authorized by a bull of Clement VII. in 1528. At first they were persecuted by the other orders, but through the influence of the duchess Cibo, wife of the duke of Camerino, they obtained papal favor, and were permitted to impart their peculiar hooded habit to any who might be willing to join them, to live as hermits in wild and desolate places, to go barefoot, to wear beards, and to call themselves "Hermits Friars Minor." The pope, however, soon gave them the nickname "Cappuccino," referring to the hood, one of their more conspicuous articles of apparel. They grew rapidly, and Matthew became the superior of the first convent. They have always had the reputation of great success in making converts. By late accounts they had 82 missions, in Europe, Asia, the East Indies, Africa, and South America. In the United States they have houses in the states of New Jersey, New York, and Wisconsin.

**CAPULETS AND MONTAGUES**, the English spelling of the names of the Cappelletti and Montecchi, two noble families of northern Italy, chiefly memorable from their connection with the legend on which Shakespeare has founded his play of *Romeo and Juliet*. According to tradition, both families belonged to Verona; but this does not appear to have been the case. The Cappelletti were of Cremona, and the fact that their burying-ground and the tomb of Juliet are shown at Verona, only proves how easy it is, in a country of ruins like Italy, to connect fact with fable. It has also been asserted that one family was Guelph and the other Ghibelline; but this is disproved by a reference to them in the *Purgatorio* of Dante (canto vi. l. 106). The poet is blaming the emperor Albert for neglecting Italy, the very garden of his domain. "Reckless man," he says, "come see how the Montecchi and the Cappelletti are oppressed;" and the context shows that the Guelphs were the oppressors in both cases of these great Ghibelline families. The emperor Albert was murdered in 1308, and this event has supplied the Veronese with a date for their legend. The first publication in which we recognize the essential incidents of Shakespeare's play is the novel *La Giuletta*, by Luigi da Porto, printed in 1535, after the death of the author. He states, in an epistle prefixed to the work, that the story was told him "by one Perigrino, a man fifty years of age, much experienced in the art of war, a pleasant companion, and, like almost all the Veronese, a great talker." In 1554, Bandello published in his collection of tales another Italian version of the legend. It was entitled *The unfortunate Death of two unhappy Lovers, one by Poison and the other of Grief*. Both writers fix the date of the event by saying it took place when Bartholomew dalla Scala or Scaliger ruled Verona. A French version of the tale was published by Pierre Borsteau in Belleforest's *Histoires Tragiques*. It was translated into English in 1567, and published in Painter's *Palace of Pleasure*. About the same time, Arthur Brooke published an English poem on the same subject, entitled *The Tragical*

*History of Romeo and Juliet, written first in Italian by Bandell, and now in English.* There is evidence that an English play had appeared previously, and that before Shakespeare's time the story was so well known in England that it had supplied subjects for tapestries. Shakespeare's play seems to have been principally based on the English poem. It was Brooke who first called the Montecchi Montagues, and the prince of Verona Escalus, instead of Scala. Wright and Cary, in translating Dante, have followed the example of Shakespeare, and render the Italian names of the *Divina Commedia* into the familiar "Capulets and Montagues" of *Romeo and Juliet*. The historical date of the tragedy has not, however, been adopted by modern stage managers and Shakespearian critics, who very properly bring down the action from the beginning to the close of the 14th c., when commercial opulence, and the revival of arts and letters, supply accessories more in keeping with the drama than the ruder age to which history must assign the "civil broils" and the fall of the Capulets and the Montagues.—See notes to Dante in *Classici Italiani*, and Knight's and Dyce's *Shakespeare*.

**CAPUT MORTUUM** (Lat., "dead head"), in history, denotes the residuum of a traditional narrative after all the supernatural or extraordinary incidents have been cast aside. What remains may be possible or likely, but rests on no evidence. See EUEMERISM. In chemistry, the term was used by the old chemists for the residuum of chemicals after the volatile substances had escaped. It is still used metaphorically for a thing or institution which has been really destroyed, though the form is left, the essential and valuable elements having been removed.

**CAPYBARA**, *Hydrochaerus capybara*, a quadruped of the order *glires* or *rodentia*, and of the family *cavidae*, strongly resembling the cavy or Guinea-pig, although it is the largest existing rodent known, and aquatic in its habits. It is a native of South America, and abounds in many of the large tropical rivers. It is equal in size to a small pig. The dentition resembles that of the cavy, except that the grinding teeth are composed of numerous transverse plates, the number of the plates increasing as the animal advances in age; an interesting point of resemblance to the dentition of the elephant, and a link of connection between the rodents and the pachydermata. The C. feeds exclusively on vegetable food, browsing on the grass near the rivers, and often committing great ravages in plantations of sugar-cane. It runs badly, but swims and dives well, and has the power of remaining under water for seven or eight minutes. It is very inoffensive, and easily tamed. The flesh, except that of old males, is good, and is eaten by all classes of persons. The C. is sometimes called water-hog, of which *hydrochaerus* is a Greek translation. In Demerara, it is called water-horse, a corruption of the Dutch *water haas*—i.e. water-hare.

**CARABIDÆ**, a tribe of beetles, or coleopterous insects, of the section *pentamera* (see COLEOPTERA), corresponding with the genus *carabus* of Linnæus, but of which the species are extremely numerous, those already known being numbered by thousands. They mostly feed on other insects, worms, etc., and are extremely voracious and active, habits which are fully shared by their larvæ. Some of them burrow in the earth; most of them live under stones, under the bark of trees, among moss, etc.; and their bodies are adapted to this mode of life, being very firm and hard. Their legs are in general pretty long, and most of them pursue their prey rather by the use of their legs than of their wings, some of them indeed being wingless, or having only rudimentary wings. Many of them exhibit much beauty of colors and metallic lustre. The largest British species is only about an inch long, but some foreign ones are much larger. Some of the species of the restricted genus *carabus* are among the most common British insects. Their wings are not fitted for flight.—A very large and singular insect of the tribe C. is *mormolyce phyllodes*, a native of Java, which, in consequence of the extremely depressed form of its body, resembles some of the *mantida* (see MANTIS) and the insects known as leaf-insects (q.v.). To this tribe belong also the bombardier beetles (q.v.).

**CARABOBO**, a state in Venezuela on the Caribbean sea; a fertile, well-watered region, producing grains, fruits, and cattle. The chief exports are coffee, cacao, indigo, rice, corn, rum, and fruits. The climate is good in the inland region, but the coast is subject to fevers. Pop. '91, 198,021. Capital, Valencia.

**CARABOU**. See REINDEER.

**CARACAL**, *Felis caracal*, a species of lynx (q.v.), found in the warmer parts of Asia, and throughout the whole of Africa; and more probably than any European species, the lynx of the ancients. It is larger than a fox, about the same height, but much more powerful; of a uniform deep brown or wine-red color, except two spots near each eye, the under parts of the body, and inner parts of the legs, which are white, and tufts of long black hair which terminate the ears. The C. is powerful enough to tear a hound.

**CARACALLA**, properly named MARCUS AURELIUS ANTONINUS BASSIANUS, a Roman emperor, the son of the emperor Septimius Severus, was b. at Lyon, 188 A.D. He was playfully named by his father Caracalla, from his long hooded tunic, made in the fashion of the Gauls, and so called in their language. After his father's death, 211 A.D., he ascended the throne as co-regent with his brother Publius Septimius Antoninus Geta, whom he afterwards caused to be murdered. Having bribed (at enormous cost) the Prætorians to overlook this foul deed, and to make him sole emperor, C. next directed his

cruelty against all the friends and adherents of Geta, of whom twenty thousand of both sexes—including the great jurist Papinianus—were put to death. Innumerable acts of oppression and robbery were employed to raise supplies for the unbounded extravagance of the despot, and to pay his soldiers. In his famous constitution, he bestowed Roman citizenship on all his free subjects not citizens—who formed the majority, especially in the provinces—but simply in order to levy a greater amount of taxes on releases and heritages, which were paid only by citizens. In his campaigns, he imitated, at one time, Alexander, at another time, Sulla; while his main object was to oppress and exhaust the provinces which had been in a great measure spared by the tyranny of former emperors. In 217, he was assassinated, at the instigation of Macrinus, prefect of the Prætorians, by one of his veterans named Martialis, on the 8th of April, 217, on the way from Edessa to Carrhæ. Historians paint the life of C. in the darkest colors. Among the buildings of C. in Rome, the baths—Thermæ Caracallæ—near Porta Capena were most celebrated, and their ruins are magnificent. The baths proper are said to have occupied a site of 720 by 370 feet in a square enclosure bordered by a portico. The outside walls, extending about one quarter of a mile on each of the four sides, and the baths are said to have contained 1800 seats for the use of the bathers. The ruins include walls, arches and vaults, and in the largest of the baths there was an open space for athletic sports, around which were raised seats for the spectators. See *illus.*, SCULPTURE, vol. XIII.

**CARACARA**, or **CARACARA EAGLE** (*polyborus*), a genus of birds of prey peculiar to America, and regarded as a connecting-link between eagles and vultures; agreeing with the former in their strongly hooked bill and claws, but with the latter in their naked face and propensity to prey on carrion. The name C. is originally Brazilian, and is derived from the peculiar hoarse cry of a common Brazilian species (*P. brasiliensis*), a bird of very fine plumage, and about 50 in. in expanse of wings, which is of frequent occurrence over a large extent of the American continent, and is sometimes to be seen even in the southern parts of the United States.

**CARACAS**, the capital of the republic of Venezuela, the most northerly state in South America, with Guiana on the e., and Columbia on the w., is situated in lat. 10° 30' n., and long. 67° 5' w., 16 m. s. of La Guayra, its port, with which it is joined by railway. It is 2,880 ft. above the tide-level, enjoying from this elevation a healthy air and a temperature so moderate as to average 68° and 72° F. in Feb. and June respectively. Standing immediately above the confluence of four streams, it is well supplied with cool water, which is distributed by means of fountains, pipes, and reservoirs. The neighborhood is subject to earthquakes—12,000 citizens having, in 1812, perished from this cause. The pop. in 1891 amounted to 72,429. The streets are straight and regular. The most splendid edifice is the church of *Alta Gracia* for the people of color, excelling the cathedral in the richness of its decorations. C. has a university founded in 1778.

**CARACCI**, a celebrated family of Italian painters, the founders of the Bolognese school of painting.

**CARACCI, LUDOVICO**, the son of a butcher, was born at Bologna, 1555. As a student, he was so inapt that his master recommended him to abandon the pursuit; but instead of that, he went to Venice and Parma, making acquaintance with the works of the great masters there, and returned to Bologna imbued with art principles quite opposed to the superficial mannerism then prevailing in his native city. In conjunction with two of his cousins, who, instructed by him, had imbibed the same ideas, he founded, in spite of great opposition, the school which afterwards became so famous in the history of painting. The first principle of this new school was, that "observation of nature ought to be combined with imitation of the best masters." The allied artists found numerous pupils, to whom they gave practical instructions in drawing from natural and artistic models, with theoretical lessons on perspective, anatomy, etc. So great was their success, that, in the course of a short time, all other schools of painting were closed in Bologna. Some of the finest works of this master are preserved in the *Accademia delle Belle Arte*, Bologna—among others, the "Madonna and Child Throned," "Madonna and Child Standing," the "Transfiguration," and the "Nativity of St. John the Baptist." Ludovico died in 1619.

**CARACCI, AGOSTINO**, cousin of Ludovico, was b. (1558) in Bologna. He became a disciple of his cousin, but he was of too versatile a genius to devote himself closely to any subject, though his magnificent painting of the "Communion of St. Jerome" proves that he might have attained to very great eminence had he devoted his undivided attention to the art; but he was in the habit of abandoning his easel for literature, poetry, and engraving on copper. As an engraver, indeed, he holds an important position in Italian art. He accompanied his younger brother, Annibale, to Rome, and there assisted in some of the paintings in the Farnese gallery; but his brother, who was a slave to his art, soon quarrelled with him for his inattention, and he left Rome, and went to Parma. He died in 1602.

**CARACCI, ANNIBALE**, brother of Agostino, was b. (1560) in Bologna, where he learned, under his father, the business of a tailor, from which he was called away by Ludovico Caracci. His progress in the study of painting was rapid, and at first he took principally for his models Correggio, Titian, and Paul Veronese. His picture of "St. Roche distributing Alms" first gained for Annibale C. a wide reputation. His fame reached Rome, and he was employed to paint the Farnese gallery there, which is

considered his greatest work, and the manner of which partakes somewhat of Raphael and Correggio. On this gallery he was employed some eight years, and he received for his work the incredibly paltry sum of 500 crowns. In disgust and vexation, the artist threw aside his palette. He died in Rome in 1609, where his remains were interred, close to Raphael's tomb, in the Pantheon. Annibale C. was one of the greatest followers of Correggio, and in composition approached most nearly to the style of Raphael. Ludovico had a greater talent in teaching, and Agostino had a more versatile invention, but Annibale was unquestionably the greatest artist of the three Caracci.

CARACCI, ANTONIO, natural son of Agostino, was b. at Venice 1588; d. in 1618. He was a pupil under Annibale, and painted some excellent pictures.

CARACCI, FRANCESCO (styled FRANCESCHINI), brother of Agostino and Annibale, was b. in 1595, and distinguished himself as an eminent designer. He died 1622.—The best Italian masters of the 17th c.—Domenichino, Guido Reni, Albani, and others—proceeded from the school of the Caracci.

CARACCIOLI. The name of a Neapolitan family unfortunately associated with the memory of lord Nelson. Several members of this family were employed in political offices.—LOUIS ANTOINE DE C., b. in Paris, 1721, d. 1803, was the author of a pseudograph, entitled *Lettres Intéressantes du Pape Clement XIV.*, which mystified many readers throughout Europe.—FRANCESCO C., 1752-1799; a Neapolitan admiral, entered in early life the marine service, and distinguished himself at Toulon, 1793. In the year 1798, the offensive conduct of the court of Naples toward C. induced him to return from Palermo, where the court was then residing, to Naples, where he entered into the service of the republic established by the French invaders, and, with a few vessels, prevented the attempted landing of a Sicilian and British fleet. In 1799, when Ruffo took Naples, C. was arrested, contrary to the terms of capitulation, sentenced to death by the junta, hanged on the mast of a frigate, and his corpse thrown into the sea. This affair, to which lord Nelson was a consenting party, is a stain on the reputation of the English admiral.

CAR'ACOLE, in horsemanship, a sudden half turn, sometimes performed frequently in an attack of cavalry to mislead the enemy as to the point at which the assault is to be made.

CARACTACUS, a king of the Silures, who inhabited s. Wales, was one of the most persistent enemies of the Romans in Britain. For nine years he warred gallantly against the invaders, but at length was completely overthrown. His wife and daughters fell into the hands of the victors, and his brothers surrendered. C. himself fled to Cartimandua, queen of the Brigantes, who delivered him up to the Romans. He was carried to Rome, 51 A.D., and exhibited to the people by the emperor Claudius. When he approached the imperial seat, we are told, he addressed Claudius in so noble a manner, that he and his relatives were immediately pardoned. They appear, however, to have lived during the remainder of their lives in Italy.

CAR'ADOC SANDSTONE and BA'LA BEDS, a division of the lower Silurian system, so named from their development at Caer Caradoc, in Shropshire. They consist of sandstones, grits, and slates, with occasional beds of limestone. Enormous masses of contemporaneous igneous rocks are interstratified with them. They attain a thickness of 9,000 ft., not including the igneous rocks.

CAR'ATA DE COLOBRANO, MICHELE, 1785-1872; an Italian composer; in early life a soldier in the French army. Among his operas are *Masaniello* and *Le Solitaire*. He was a member of the Paris academy of fine arts, professor in the conservatoire, director of military music at the gymnase, and a member of the legion of honor.

CARAFE (Fr., from Italian *caraffa*, a decanter), a water-bottle of glass for the table or toilet, a term long in use in Scotland, but of later introduction into England and the United States.

CARAGLIO, a t. of northern Italy, in the province of Coni, 6 m. w. of the city of that name. It is situated on the Grana, and has manufactures of silk. Pop. about 7000.

CAR'AITES. See JEWISH SECTS

CARAMANIA. See KARAMAN.

CARAM'BOLA, an East Indian fruit, of the size and shape of a duck's egg, but with five acute angles, or longitudinal ribs. It has a yellow, thin, smooth rind, and a clear watery pulp, in some varieties sweet, in others acid, of very agreeable flavor. It is often used in making sherbets, and in tarts and preserves; and is known to the British in India as the *Coromandel gooseberry*. It is one of the most universally cultivated and abundant of the fruits of India. It is produced by the *averrhoa carambola*, a small evergreen tree, or bush, of the natural order *oxalidæ*. The BILIMBI, or BLIMMING, is the very acid fruit of another species of the same genus, *A. bilimbi*, also East Indian. Both species are now much cultivated in the tropical parts of America. Both exhibit an irritability of leaf resembling that of the sensitive plant; they also display in a remarkable degree the phenomena known to physiologists as those of sleep of plants (q.v.).

**CARAMEL** is the name applied to the dark brown and nearly tasteless substance produced on the application of heat to sugar (q. v.). It is likewise formed during the roasting of all materials containing sugar, such as coffee, chicory, and malt (see **BEER**), and is one cause of the dark color of porter and infusions of coffee. It is also employed in the coloring of whisky, wines, vinegar, etc. The name is also given to a kind of confectionery (q. v.).

**CARAMNASSA**, a river in the presidency of Bengal, which rises in lat.  $24^{\circ} 84'$  n., and long.  $83^{\circ} 46'$  e., and, after a course of about 150 m., enters the Ganges from the right in lat.  $25^{\circ} 28'$  n., and long.  $83^{\circ} 58'$  east. It is remarkable on several grounds. Though, on issuing from its source, it is clear as crystal, it is yet said to be both nauseous and noxious—a peculiarity which the natives impute to various supernatural causes; about 50 m. from its mouth, it is crossed by a stone bridge of three wide arches, which forms part of the grand road from Calcutta to Delhi; and lastly, it is so exceptionally subject to floods, that it has been known to rise 25 ft. in a night.

**CARANA RESIN**, more commonly, but less correctly, called **GUM CARANA**, is a resinous substance imported from the tropical parts of America. Its properties and uses resemble those of **tacamahac**. It is entirely soluble in alcohol, and melts in a slight heat. It is not well known what tree produces it.

**CARAN'JA**, an island on the e. side of the ordinary entrance of the harbor of Bombay (q. v.), separated from the mainland by a narrow and unserviceable channel of 4 m. in length. It is itself 2 m. broad, being comparatively level and fertile, with the exception of two hills—the Little Hill in the n., and the Great in the south.

**CARANK**. See **SCAD**.

**CARAPA**, a genus of plants of the natural order *meliceae*, natives of warm climates. *C. Guianensis* or *guaroides*, sometimes called the *anderaba*, also the *C. tree*, is a large tree with beautiful shining pinnate leaves, which have many leaflets, a native of Guiana and the adjacent countries, where its bark has a great reputation as a febrifuge, and the oil obtained from its seeds is much used for lamps. Masts of ships are made of its trunk. The oil, which is called oil of carapa, is thick and bitter, and is anthelmintic.—*C. Touloucouna*, or *Guineensis*, an African species, yields a similar oil, which is employed by the negroes for making soap, and for anointing their bodies, its bitterness protecting them from the bites of insects, a purpose to which the oil of *C.* is also applied in South America.—These species are very similar, and are supposed by some botanists not to be essentially distinct.

**CARAPACE**, the dorsal shield or buckler of chelonian reptiles (tortoises and turtles), and of the *crustacea malacostraca* (crabs, lobsters, etc.). In animals so widely different, however, there is only, a general similarity in the appearance of the *C.*, and the purpose which it serves; its organic relations are very different. For notice of these, we refer to the articles **CHELONIA** and **CRUSTACEA**.

**CAR'AT**, originally, it would seem, the name given to the seeds of the Abyssinian coral flower (q. v.) or coral-tree (*erythrina Abyssinica*); but these, which are small, and very equal in size, having been used in weighing gold and precious stones, *C.* has become the designation of the weight commonly used for weighing precious stones, and particularly diamonds. The seeds of the carob (q. v.) tree have also been said to be the original *C.* weights of jewelers, but with less probability.

Goldsmiths and assayers divide the troy pound, ounce, or any other weight, into 24 parts, and call each a *C.*, as a means of stating the proportion of pure gold contained in any alloy of gold with other metals. Thus, the gold of our coinage and of wedding-rings, which contains  $\frac{1}{10}$  of pure gold, is called "22 carats fine," or 22 *C.* gold. The lower standard used for watch-cases, etc., which contains  $\frac{1}{12}$  of pure gold, is called 18 *C.*, and so on. The *C.* used in this sense has therefore no absolute weight; it merely denotes a ratio. This, however, is not the case with the *C.* used for weighing diamonds, which has a fixed weight, equal to  $3\frac{1}{4}$  troy grains, and is divided into quarters, or "C. grains," eighths, sixteenths, thirty-seconds, and sixty-fourths. These *C.* grains are thus less than troy grains, and therefore the jeweler has to keep a separate set of diamond weights.

**CARAU'NIUS**, a supposed native of Holland, of whom nothing is certainly known except that he had a conspicuous part as an ally of the Romans in the conquest and ruling of Britain near the close of the 3d century. He had been put in command of the fleet in the English channel for the purpose of protecting the coasts of Britain and Gaul from the Frisian pirates; and his conduct had been such that the Roman emperor Maximilian gave an order for his death. *C.* immediately assumed the title of emperor of Britain, and held power for about seven years, his independence having been acknowledged by the Romans, whose empire was rapidly falling into ruin. He was assassinated at York in 293 by his chief officer and rival, Allectus, who held the imperial title for three years, at end of which time (296) Constantine Chlorus re-established the rule of Rome.

**CARAVA'CA**, a t. in Spain, in the province of Murcia, about 39 m. n.w. of the city of that name, is situated on the slope of a hill crowned with a fine old castle. Its principal

streets are wide, clean, and well paved; it has a fine church, with a miraculous cross, that is annually taken down and bathed in the waters of the town, to which it is supposed to communicate sanitary properties. It has manufactures of linen and woollen fabrics, soap, paper, leather, etc. Pop. about 15,000.

**CARAVAGGIO**, a t. of northern Italy, in the province of Bergamo, about 24 m. e. of Milan. In the principal church are some esteemed paintings by Campi; and C. is also celebrated as the birthplace of the painters Polidoro Caldara, and Michael Angelo Merighi, both surnamed Caravaggio. In the neighborhood is a sanctuary of the Madonna, built from designs of Pellegrini (1575). Pop. about 8,000.

**CARAVAGGIO**, MICHAEL ANGELO AMERIGHI OR MERIGHI DA, a celebrated Italian painter, was b. 1569, at Caravaggio, in Lombardy, northern Italy. His father, who was a mason, employed him in making paste for the fresco-painters, and in this way the artistic genius of the boy was stirred. After studying the works of the great masters in Milan and Venice, he went to Rome, where he lived for some time in very reduced circumstances. At length a picture of his attracted the notice of Cardinal del Monte, who now patronized the young artist; but the ferocious and quarrelsome character of C. soon involved him in difficulties. Having fled from Rome to Malta, on account of manslaughter, he obtained the favor of the grand-master by painting an altar-piece in the church of St. John, and other pictures. His quarrelsome nature soon forced him to flee from Malta; and, in making his way back to Rome, he was wounded, lost all his baggage, caught a violent fever, and on reaching Porto Ecole, lay down on a bank and died (1609), at the age of 40. Truthness to nature was the object aimed at by C., who left all schools, and devoted himself to paint life as he found it in lanes, alleys, and other resorts of the lower classes. He studied no such matters as refined sentiment or elevation of realities, but gave in his paintings expression to his own wild and gloomy character. One of his best paintings, "The Fraudulent Gamblers," is preserved in the Sciarra gallery, at Rome. His shadows are deep, his backgrounds very obscure; in consequence of which the whole picture seems to possess a kind of mysterious greatness, that is very imposing. Even Rubens confessed that C. was his superior in chiaroscuro. When he painted sacred subjects, he remained falsely faithful to the low realities of Italian life; so that several of his pictures painted for churches, had to be removed from their places, because they could not be harmonized with sacred associations. Kugler, the German critic, has justly said of one of C.'s most celebrated works, a "Burial of Christ," that it appears "like nothing better than the funeral of a gypsy chieftain."—An earlier Italian painter of less eminence, **POLIDORO CALDARA DA CARAVAGGIO**, was born in 1495, and murdered in 1543.

**CARAVAN** (from the Persian *karvan*, i.e., trader), the name given to the great assemblages of travelers which, at stated times, traverse the deserts of Asia and Africa. Many caravans are entirely for the purposes of trade, the merchants associating themselves for mutual help and protection. A C. sometimes has so many as 1000 camels, which follow each other in single file, so that it may be a mile or more in length. The most celebrated caravans are those formed by pilgrims going to Mecca, particularly those which annually assemble at Cairo and at Damascus. The latter consists of 30,000 to 50,000 pilgrims, and is under the special protection of the Turkish sultan. The caravan by which the Persians travel to Mecca starts from Bagdad, and is the vehicle of a very important trade. The great Indian C. to Mecca, which started from Muscat, has been long given up. Mecca, upon the arrival of the caravans, bringing goods from so many different parts of the world, presents all the appearance of a vast fair. The trade between Tripoli and the interior of Africa is exclusively carried on by caravans, likewise that between Darfur and Egypt. The great trade between Russia and China is also a C. trade. In the east, caravans in which the camels have a load of 500 to 600 lbs. are called *heavy* caravans; *light* caravans are those in which the camels have only half that weight, so that the daily journeys may be longer. *Heavy* caravans travel from 17 to 18 m. a day; *light*, from 23 to 25. The caravans are generally conducted with great regularity, and assemble at and start from stated places on stated days. The leader of the Mecca caravans is called *emir-el-hadsch*, i.e., prince of the pilgrims. In trade-caravans, a leader, who is called *karwan-baschi*, is elected by the merchants from their own number.

Among the knights of Malta, caravans meant the troops of knights appointed by the order to serve in garrisons, and also the cruises of their galleys against the Turks.

**CARAVANCES.** See CHICK PEA.

**CARAVANSARAI**, or **KHAN**, an eastern institution, a sort of unfurnished inn to provide travelers with a shelter. Those in towns and cities, which are generally built for traders, and charged a small sum a day, are handsomer and more convenient—having doors to the apartments—than those met with on the roads or outside the walls of the cities. They commonly consist of a square building of four wings built round a courtyard, in which the beasts of burden may be inclosed, and where there is usually a well of water; the lodgings are small rooms, about 7 or 8 ft. high, which run round the courtyard, and are bare of every article of furniture.

These caravansarais are an institution of very ancient date, being the "inns" of Gen.

xlii. 27, xliii. 21; and it was in the stable of such a place, there being no room for his parents in the lodging apartments, that our Savior was born (Luke ii. 7). They belong either to government, to some private individual, or are the property of the church (mosques); those situated in towns or cities are charged, but not more than two or three Turkish piastres a day; those situated on the road are usually free. There are some large and very handsome caravansarais at Cairo, Damascus, Beyrout, Aleppo, etc. The steward or keeper of a C. is called a *caravanseraskier*.

**CARAVELLAS**, a seaport of Brazil, in the province of Espirito Santo, near a bay of that name; pop. about 3,000. It is the principal port of the surrounding country, and the head-quarters of the whale fishery of the Abrothos islands, which lie off the coast.

**CARAWAY**, *Carum carui*, a plant of the natural order *umbellifera*, growing abundantly in meadows and rich pastures in the middle and s. of Europe, and in some parts of Asia, naturalized in many places in Britain. In some parts of Holland and Germany, and also in the counties of Kent and Essex in England, it is extensively cultivated for its aromatic seeds—in more strict botanical language, *carpels*—which are used medicinally as a carminative and tonic, and are also very much used as an aromatic condiment, and by confectioners, distillers, and perfumers, entering into the preparation of liqueurs, cakes, sweetmeats, scented soaps, etc. They depend for their aromatic properties on a volatile oil called oil of C., which is obtained by bruising C. seeds, and distilling them with water, and is at first limpid and colorless, but becomes yellow and subsequently brown by keeping. Oil of C. is used medicinally to relieve flatulence, and to correct the nauseating and griping tendencies of some cathartic medicines; also in the preparation of *spirit of C.* and *C. water*.—Spirit of C., which may be prepared either by dissolving the oil of C. in proof-spirit, or by distilling bruised C. seeds along with proof-spirit, is much used in Russia and Germany as a liqueur (*kämmel-branntwein*), sweetened with sugar.—C. has a branching stem 1 to 2 ft. high, with finely divided leaves, and dense umbels of whitish flowers. The fruit is oblong, each carpel having five thread-like ribs, with a single *villa* (see *UMBELLIFERÆ*) in each of the interstices. The white carrot-shaped root of C. is sometimes used like carrots or parsnips, but has a very strong flavor.—C. has a great enemy in the **CARAWAY MOTH** (*hæmylis daucella*), the larva of which destroys both its stem and flowers.

**CARBAZO' TIC ACID**, or **PICRIC ACID**, is a substance of great importance in dyeing, which is obtained by the action of strong nitric acid and heat on many complex organic materials, such as silk, indigo, salicine, and a variety of resins. On a commercial scale, it is best obtained from the heavy oil of coal-tar, which distills over from crude tar between 300° and 400° F. (150–200° C.), or from the resin of *xanthorrhoea hastilis*. The hot nitric acid solution is strained from impurities, and on cooling, yellow crystals separate of C. A., which can be purified by washing with cold water. These crystals are readily soluble in alcohol and ether, and dissolve in 80 or 90 times their weight of cold water, yielding a yellow solution, which has a very bitter taste, and stains the skin yellow; and when silk which has been treated with a mordant of alum, or cream of tartar, is immersed in a solution of C. A., it is dyed of a beautiful permanent yellow color. The bitter taste of C. A. has led to its being fraudulently employed, instead of hops, in communicating a bitter taste to beer.

**CARBIDES**, compounds of carbon with a metal. None occur in a natural state, and they are difficult to obtain in a definite form. Carbon makes the metal hard and brittle.

**CARBINE** is a light kind of musket, named probably from the Carabins. See next article. It is now used by the cavalry, the yeomanry cavalry, the Irish constabulary, and other corps. The best carbines are now rifled. A considerable number of American carbines, rifled and breech-loading, were purchased at a high price by the English government in 1856. This American C. has a barrel only 23 in. in length, and a total weight of 7½ lbs. It is simple in construction, has a great range, hits a mark with accuracy, may be fired with rapidity, requires little cleaning, can be loaded without a ramrod, and supplies itself with caps from a reservoir in the hammer. Among English makers, Mr. Prince has successfully applied the breech-loading principle to carbines. The Victoria cavalry C. has a barrel 26 in. long, with 0.738 in. bore; its weight is 7½ lbs., and it is fired with 2½ drams of powder. See illus., GUNS, vol. VII.

**CARBINERS**, or **CARABINEERS**, are said to have derived their designation from the Arabs, among whom the *Carabins* or *Karabins* were light horsemen, stationed at outposts to harass the enemy, defend narrow passes, etc.; in action, they took the place of skirmishers. A corps under the same name was raised in France in 1560; but the designation has not been much used in that country since the introduction of hussars and lancers. In the English army, C. was at one time a frequent designation for cavalry.

**CARBOHYDROGENS**, or **HYDROCARBONS**, are a series of compounds belonging to organic chemistry, which are composed of carbon and hydrogen, only in such proportions that the various members of the group differ from each other in definite and regular numbers of atoms of carbon and hydrogen. The best-marked group of hydrocarbons commences with methylene, CH<sub>2</sub>, which may be regarded as the first step in the ladder, and by the successive addition of groups containing one atom of carbon and two atoms

of hydrogen, we obtain ethylene or olefiant gas,  $C_2H_4$ , propylene,  $C_3H_6$ , butylene or oil gas,  $C_4H_8$ , amylene,  $C_5H_{10}$ , etc. There are also series beginning with methyl,  $CH_4$ , then ethyl,  $C_2H_6$ , and with hydride of methyl or marsh gas,  $CH_4$ , then hydride of ethyl,  $C_2H_6$ . The members of these groups are likewise characterized by a gradual ascending difference in their chemical and physical properties, especially the boiling-point, which rises by a given amount.

**CARBOLIC ACID**, or **PHENIC ACID**, *Phenyl alcohol*, *Phenol*,  $C_6H_5OH$ , is the principal acid substance procured during the distillation of coal-tar. It is produced also by the distillation of gum benzoin and the resin of *xanthorrhoea hastilis*. It has been supposed probably erroneously, to be present in normal urine. It crystallizes at ordinary temperatures in colorless needles. It smells like tar or creosote, and has a hot taste. It is a powerful antiseptic, and quickly arrests all putrefactive and fermentive changes. Hence it is used, freely diluted in water, as a dressing in the antiseptic system of treating wounds, first practised by Mr. Lister, when professor of clinical surgery in Edinburgh university. It is also used for purifying or rendering inoffensive sewage (q.v.), etc.

It has been introduced into the American pharmacopœia, where its characters and tests are thus described: "In colorless acicular crystals, which at a temperature of  $104^\circ F.$  ( $40^\circ C.$ ) become an oily liquid, having a strong odor and taste resembling that of creosote, which it also resembles in many of its characters and properties. Its specific gravity is 1.065; boiling-point,  $356^\circ F.$  ( $180^\circ C.$ ). The crystals readily absorb moisture on exposure to the air, and they are thus liquefied; the acid, however, is but slightly soluble in water, but it is freely soluble in alcohol, ether, and glycerine. It does not redden like litmus paper; a slip of deal dipped into it, and afterwards into hydrochloric acid, and then allowed to dry in the air, acquires a greenish-blue color. It coagulates albumen. It does not affect the plane of polarization of a ray of polarized light." It may be taken internally in doses of from one to three grains in the same class of cases as those in which creosote is prescribed. Its principal uses are as external applications, in which, in various degrees of dilution, it is serviceable in unhealthy ulcerations, gangrenous sores, ozæna and all fetid discharges, gleet, the destruction of lice, and especially, as Prof. Lister has shown, as an application in compound fractures (in which it coagulates all albuminous effusions, and forms a solid crust, impermeable to air, over the broken surface), and to abscesses immediately after they have been opened. Indeed, it is most probable that his investigations on the treatment of abscess will, like those on the treatment of compound fractures, lead to a total alteration in this department of surgery. The observations of Pasteur and others have shown that, in even apparently the purest air, numerous organic germs are always floating. In a hospital ward, these germs are multiplied to an extraordinary degree. In any wound exposed to the atmosphere (as a compound fracture), decomposition takes place by the action of these germs, and hence it is necessary to introduce the C. A., which has the power of destroying these germs, into the interior. In an unopened abscess, no septic organisms are present, and the object of the surgeon is to guard against their introduction from without, and at the same time to afford a free exit for the discharge of the contents of the abscess. The following are the outlines of Prof. Lister's mode of proceeding: A square piece of rag is dipped in a solution of one part of crystallized C. A. and four parts of boiling linseed oil, and is laid upon the skin where the incision is to be made. The lower edge being raised, a scalpel dipped in the oil is plunged into the cavity of the abscess, and a sufficient opening made; and the moment the knife is drawn, the raised part of the rag is dropped upon the skin as an antiseptic curtain, beneath which the pus escapes. The cavity of the abscess is firmly pressed, so as to remove as nearly as possible all the existing pus, and if it should seem expedient, a piece of lint dipped in the oily mixture may be introduced, so as to check bleeding and prevent primary adhesion of the cut surfaces. "Thus," says Prof. Lister, "the evacuation of the original contents is accomplished with perfect security against the introduction of living germs. This, however, would be of no avail unless an antiseptic dressing could be applied that would effectually prevent the decomposition of the stream of pus constantly flowing out beneath it." He finds that the most suitable dressing is made as follows: Six tea-spoonfuls of the oily solution are mixed with common whiting (carbonate of lime) so as to form a putty, which is spread upon six inches square of common tinfoil, strengthened with adhesive plaster to prevent its tearing. The tin thus spread with putty is laid upon the skin, so that the middle of it corresponds with the point of incision, the antiseptic rag used in opening the abscess being removed the moment previously. The tin is then fixed with adhesive plaster, the lowest edge being left free for the escape of the discharge into a folded towel placed over it, and secured with a bandage. The dressing must be removed every day, and a piece of rag dipped in the oily solution must be placed on the incision when the first tin is removed, so as to guard against the possibility of the entrance of germs during the cleansing of the skin with a dry cloth, and pressing out any discharge that may exist in the cavity. If a piece of lint was inserted into the wound, it must be removed when the tin is applied. From the absence of the irritation excited by decomposition, pus almost at once ceases to be formed under this treatment; and large



abscesses, after their original contents have been evacuated, often yield in 24 hours only a few drops of serum in the course of a few days. The pharmacopœia gives the glyceride of C. A. (consisting of one part of the acid to four of glycerine) as a good form for local application; but the proportion of acid must vary with the case. In the early experiments made with Prof. Koch's (q.v.) lymph in 1890, the dilutions were made in part with C. A., whence it was claimed by certain physicians that the destruction of the bacteria was due partly, or perhaps wholly, to the action of the C. A.

The value of C. A. as a disinfectant was placed beyond all doubt by the investigations made at the request of the royal commissioners, who were appointed to obtain information and report on the cattle disease. In the same way, C. A. is highly serviceable in military camps, on board ship, in disinfecting dunghills, in purifying the air of sick-rooms, stables, bird-cages, and any place where the germs of disease do or may lurk. It is extensively used for preserving wood, as in railway sleepers. It has recently acquired importance as a source of dye-stuffs, Victoria orange, phénicienne or phenyl brown, coralline, etc. C. A. acts as a powerful poison on animal and vegetable life in general. The creasote (q.v.) obtained from coal-tar is often simply a pure form of carbolic acid. See Cheyne's *Antiseptic Surgery* (1892) and ANTISEPTICISM.

**CARBON** is one of the elementary substances largely diffused in nature. It occurs uncombined in the mineral graphite, or black-lead (q.v.), and in the diamond (q.v.), which is pure crystallized carbon. It is much more abundant, however, in a state of combination. United with oxygen, it occurs as carbonic acid,  $\text{CO}_2$  (q.v.), in the atmosphere, in natural water, in limestone, dolomite, and ironstone. In coal, it is found combined with hydrogen and oxygen; and in plants and animals, it occurs as one of the elements building up wood, starch, gum, sugar, oil, bone (gelatine), and flesh (fibrine). Indeed, there is no other element which is so characteristic of plant and animal organisms, and it ranks as the only element never absent in substances obtained from the two kingdoms of organic nature. Wood-charcoal, coke, lampblack, and animal charcoal are artificial varieties, more or less impure, of carbon. The atomic weight or equivalent of C. is 6 (new sys. 12); the specific gravity greatly varies; that of the diamond is 3.530 to 3.550 (water being 1.000), and of graphite 1.800. C., in its ordinary forms, is a good conductor of electricity; in the form of diamond, it is a non-conductor. Of heat, the lighter varieties of C., such as wood-charcoal, are very bad conductors; graphite in mass has very considerable conducting powers. At ordinary temperatures, all the varieties of C. are extremely unalterable; so much so, that it is customary to char the ends of piles of wood which are to be driven into the ground, so as by this coating of non-decaying C. to preserve the interior wood; and with a similar object, the interior of casks and other wooden vessels intended to hold water during sea-voyages, are charred (coated with C.), to keep the wood from passing into decay, and thereby to preserve the water sweet. Its power of arresting odors and colors likewise varies much. See BONE-BLACK. In the simple property, even of combustion, there is a marked difference. Wood-charcoal takes fire with the greatest readiness, bone-black less so; then follow in order of difficulty of combustion—coke, anthracite, lampblack, black-lead, and the diamond. Indeed, black-lead is so non-combustible, that crucibles to withstand very high heats for prolonged periods without breakage or burning, are made of black-lead; and the diamond (q.v.) completely resists all ordinary modes of setting fire to it. In the property of hardness, C. ranges from the velvet-like lamoblack to diamond, the hardest of gems.

*Carbon for electrical purposes.*—When C. is obtained of sufficient density, it is found to be a good conductor of electricity, and to make an excellent electro-negative element in a galvanic pair. Graphite displays these qualities to advantage, and so does the hard incrustation of C. that is found sublimed in gas retorts. Coke and wood-charcoal are too porous to possess them to any great extent. The scarcity of graphite, and the precarious supply of retort C., preclude the possibility of obtaining much practical advantage from the electrical properties of C. with these substances alone. We are indebted, however, to prof. Bunsen, of Heidelberg, for the discovery of a process whereby a C. of the requisite density can be manufactured with great ease and economy. The carbons thus obtained for galvanic batteries rival platinum in electric energy, and they have aided in no small degree, from their cheapness, in heightening the utility of galvanic electricity. The Bunsen carbons, as manufactured in Germany, are of the form of hollow cylinders, whereas those made in France and this country are solid rectangular prisms. The following are the more important details of the process. Two parts of coke, and one of baking-coal—the proportion varying to some extent with the materials—are ground to a fine powder, and passed through a sieve. The powder so got is transferred to iron-plate molds of the required shape, the seams of which are merely clasped together, and luted with clay. No pressure is employed in filling them, other than that of shaking. When the molds are filled, they are placed in a furnace, and kept there till all carburetted hydrogen has escaped from them. They are then taken out, and allowed to cool before the mass within is removed, which is now found to have taken a solid form, and to be so hard that it may be turned or ground to the exact size wanted. At this stage, the carbons are destitute of electrical action, and they must consequently be rendered more dense by a subsequent process. This consists in soaking them thor-

oughly in thick sirup, or, better still, in gas-tar thickened by boiling, and laying them aside till dry, after which they are packed with charcoal-dust in fire-proof crucibles, and exposed for a considerable time to a high heat. If one soaking and charring is not enough, the same may be repeated until sufficient density is obtained. Throughout the process, it is essential that all flaming matters be driven off, so as to leave only the C. in the mold; and care must be taken that no air be admitted to the mold when under the action of heat, otherwise there would be a loss of C. from combustion. The manufacture of these carbons may be carried on contemporaneously with that of gas. For a description of the carbon pencils used in arc lights and the filaments of incandescent lamps see ELECTRIC LIGHTING.

**CARBON**, a co. in e. Pennsylvania; 412 sq. m.; pop. '90, 38,624. Co. seat, Mauch Chunk.

**CARBON**, a co. in s.e. Wyoming, touching Colorado, and crossed by the Union Pacific railroad; area, 7800 sq. m.; pop. '90, 6857. Co. seat, Rawlins.

**CARBONARI** (literally "colliers" or "charcoal-burners"), the name of a secret political society, first, in some degree, made known in 1820. The constitution, like the precise objects of the C., still remains in a great measure secret; though they have printed instructions, catechisms, statutes, rituals, etc., for their associates. The statements respecting the high antiquity of this secret confederacy are quite fabulous. There is every reason to believe that it originated during the last French *régime* in Naples. Botta, in his *Storia d'Italia*, states that, under Murat's government, the Neapolitan republicans, equally hating the French and king Ferdinand, escaped into the wild defiles of the Abruzzi, and here, naming themselves "C.," formed a secret society. It is said that their leader, Capobianco, had great powers of popular eloquence, and that their motto or war-cry was, "Vengeance for the lamb torn by the wolf." See CAPOBIANCO.

The peculiar phraseology of the C. is taken from the vocation of charcoal-burners. For instance, they are (or were) wont to speak of "clearing the forest of wolves." The "wolves" probably meant at first foreign tyrants; but in the course of time, after the restoration of the Neapolitan Bourbons, such symbolical expressions had reference to their despicable misrule. Among themselves the initiated were styled "good cousins." The various societies do not seem to have possessed a common center, or to have been properly organized for combined action. A place of meeting was styled "a hut" (*baracca*); the external neighborhood "the forest;" and the interior of the hut was the *candila* or "place for selling coal." A union of several of these huts formed a "republic." The superior huts (*alte vendite*) at Naples and Salerno, endeavored, but without success, to effect a centralization of the Carbonari. The society, soon after its institution, numbered 24,000 to 30,000 adherents, and increased so rapidly in Italy, that in Mar., 1820, it is said as many as 650,000 new members were initiated, including considerable numbers of the military and the clergy. The religious and Protestant character of the order is expressed in its statutes, which include the article: "That every carbonaro has the natural and unalterable right of worshipping God according to his own convictions."

After the restoration of the Bourbons several secret political unions were formed in France, and in 1820 were confederated with the Carbonari. Paris, after the prosecutions against the secret societies of Italy, was made the head-quarters of a carbonarism which, adopting all the symbolic phraseology, rules, and regulations of the Italian societies, received from the rapidly systematizing genius of the French, an organic character which it had never before possessed. The initiated styled themselves *bons cousins*, and spoke of the uninitiated as *pagani* (heathens). Written documents and communications were strictly prohibited by the heads of the union, and treachery was to be punished by assassination. After the close of the French and Spanish war, the C., whose activity in contriving plots had excited the terror of the French prefects, restricted its endeavors to the circulation of republican ideas, without direct attempts towards insurrection. After the July revolution, several of the leading French C. attached themselves to the new régime, and their society was gradually dissolved. In its place the new *Carbonnerie Démocratique* was founded, having for its object the establishment of a republican government, founded on the principles of Babeuf (q.v.). The endeavor of these new C. to make Paris the center of all political movements, led to the secession of the Italian refugees, who associated themselves under the title "Young Italy." French carbonarism is not known to exist at present, and it is possible that even in Italy the triumphs of constitutional patriotism during recent times have rendered its existence no longer necessary, but it certainly was alive at the commencement of the Franco-Sardinian war with Austria; and one of the rumors of the time was, that the French emperor—who, in his young republican days, had been a member of this society—had entered on the war of liberation, to conciliate his old associates, who had menaced him with the fate of a traitor. See MAFFIA, MALA VITA.

**CARBONATED** or **ACIDULOUS WATERS** are those which contain a great excess of carbonic acid gas. The amount of gas in ordinary spring and well waters does not amount to more than 8 to 8 cubic in. in 100 cubic in. of the water; but in waters entitled to be called C., the proportion of gas to 100 cubic in. of water rises 30 to 60, when they are considered rich; 100 to 200 when they are very rich; and in the waters of St. Nectaire it is said that the proportion of gas is as high as 400 volumes to 100 of the

water. These waters sparkle much when poured from one vessel to another. The carbonic acid is free, but is generally accompanied (1) by bicarbonate of soda, when the water is called *carbonated-alkaline* or *acidulo-alkaline*, as in the Seltzer, Pyrmont, Salzbrunn, Altwasser, and Reinerz acidulous mineral springs; or (2) by carbonate of iron, when the water is named *carbonated* or *acidulous chalybeate*. See CHALYBEATE WATERS. The mineral spring at Irkeston, near Nottingham, is the only water of this nature in Britain. The C. or acidulous waters are very refreshing and exhilarating, and are useful in certain disordered states of the stomach; they relieve nausea, and generally increase the discharge of liquid from the system. They are objectionable in the case of persons of a full and inflammatory state of body. See MINERAL WATERS.

**CARBONATES**, chemical substances which are compounds of carbonic acid with a base; e.g., carbonates of lime, potash, soda, iron, lead, copper, silver, etc. Their formulæ are: carbonate of lime (marble),  $\text{CaCO}_3$ ; carbonate of potash,  $\text{K}_2\text{CO}_3$ ; carbonate of iron (protoxide),  $\text{FeCO}_3$ , etc. As affinities of carbonic acid are very weak, carbonates are easily decomposed: by heat, as in reducing marble and limestone to lime; by a more powerful acid, as in the preparation of certain kinds of bread, which are made light by the carbonic acid set free from the bicarbonate of soda, the carbonate of potassa, or the carbonate of ammonia, by the acid of sour milk; by the acid tartrate of potash (cream of tartar); by an acid phosphate, prof. Horsford's method; or by hydrochloric acid; or as in the preparation of so-called soda-water, which is merely common water surcharged with carbonic acid set free from marble chips by sulphuric acid.

**CARBONDALE**, city, Lackawanna co. Penn., near the head of the Lackawanna river, and on the Erie, the Delaware and Hudson, and the New York, Ontario, and Western railroads; 16 miles n.e. of Scranton. The city was incorporated in 1851, and is in the midst of one of the most important coal-mining districts in the state. It is connected with the suburbs by trolley cars, and has electric lights, gas, and a fine system of water-works, machine-shops, car-shops, grist-mills, foundries, high school with library, public library, national bank, and daily and weekly newspapers. Pop. '90, 10,833.

**CARBON DISULPHIDE**, or **BISULPHIDE**, also called by workmen sulphur alcohol, a chemical compound produced by burning carbon in an atmosphere of sulphur, or by distilling certain metallic sulphides with charcoal. It is a colorless liquid, of specific gravity of 1.268 and boils at  $114^\circ \text{F.}$  ( $46^\circ \text{C.}$ ). It does not combine with water, but readily mixes with alcohol, ether, many oils, and hydrocarbons. It readily dissolves indiarubber, gutta-percha, resins, oils, camphor, phosphorus, sulphur, and iodine, and is very inflammable. With oxygen or atmospheric air it forms an explosive compound. It is of great use in manufacturing in many ways, such as vulcanizing indiarubber, extracting fat from bones, dissolving oil from seeds, removing sulphur and bitumen from rocks, making pure spices, purifying paraffine; also for destroying vermin, producing artificial cold, making photographic light, cleaning greasy rags, preserving hides and fresh meat, and making delicate perfumes. It is also used to some extent in medicines. The odor of the crude article is most sickening. It has a high refracting power, and is used in prismatic glass bottles for producing a spectrum, with an electric or a lime light.

**CARBONIC ACID**, **FIXED AIR**, or **CHOKE-DAMP**, is a substance occurring free as a gas in the atmosphere, to the extent of 1 volume to 2,500 of air, and also in combination with a variety of substances. It is most easily prepared for experimental purposes from chips of marble, water, and hydrochloric acid, which are placed in a gas bottle with tubes. The hydrochloric acid,  $\text{HCl}$ , acts on the marble,  $\text{CaCO}_3$ , and forms chloride of calcium,  $\text{CaCl}_2$ , water,  $\text{H}_2\text{O}$ , and carbonic acid,  $\text{CO}_2$ , which escapes as gas with effervescence, and may be conducted by a proper tube under the mouths of jars filled with water and placed on a pneumatic trough. Where C. A. is required in large quantities, it is prepared in a leaden vessel from chalk,  $\text{CaCO}_3$ , and sulphuric acid,  $\text{H}_2\text{SO}_4$ , diluted with water, when sulphate of lime,  $\text{CaSO}_4$ , is formed, and C. A. escapes as gas.

The atomic weight or equivalent of C. A. is 44; it is a clear, colorless gas, with a pleasant acidulous smell and taste. Under great pressure and cold, it can be condensed into a liquid, and even a solid resembling snow in appearance. Under ordinary atmospheric pressure, C. A. dissolves in water to the extent of 2 volumes of gas in 8 of water; but under increased pressure, a very much larger amount of gas is taken up by the water, and in this way the various kinds of **AERATED WATERS** (q.v.) are prepared. The gas is more than half as heavy again as ordinary air, being 1529. It is incombustible, and a non-supporter of combustion, at once extinguishing a lighted candle, gas jet, or even a piece of burning phosphorus, when these are placed in a jar filled with the gas, or even in a mixture of C. A. and air. This power of putting out flame and fire has been turned to account in the extinguishing of burning coal-mines, where, all the openings to the mine being properly secured, C. A., in the form of the spent air from an ordinary coal-furnace, has been passed into the mine, with the result of successfully stopping the fire. It is irrespirable in a concentrated form, producing spasm of the glottis, which prevents the admission of the gas into the system; and when mixed with air, it can be breathed without suspicion, and then acts as a narcotic poison, even when present only to the extent of 4 or 5 per cent of the air. The deadly effects of C. A. are

observed, in the combustion of charcoal, coal, or *coal-gas*, in *chauffers*, furnaces, or in fireplaces with the dampers down, when the deadly fumes of C. A. steal more or less quickly over the inmates of the room, and they almost unconsciously become its victims—thus unknowingly following the course of the Parisian suicide, who purposely lights a charcoal fire in the center of his room, and prepares for death; and in overcrowded rooms where the C. A., exhaled from the lungs of each inmate at every breath, poisons the air of the apartment, and day by day slowly but surely robs the robust of health, and ultimately of life. In such cases as the Black Hole of Calcutta (q.v.), where there was scarcely any outlet for the poisonous gas, only a few hours may be required to complete the catastrophe.

Though poisonous when inhaled by the lungs, C. A. is rather refreshing when taken into the stomach. Thus, aerated beverages of all kinds—beer, champagne, and carbonated mineral waters—owe their refreshing and invigorating qualities to the presence of C. A.; and if the gas be allowed to escape, they become almost tasteless, stale, and mawkish.

Besides abounding everywhere in the atmosphere, C. A. is largely evolved from fissures in the earth, especially in volcanic districts. In the *poison* or *Upas valley* of Java, which is a valley of an oval form, about  $\frac{1}{4}$  of a mile in circumference, and 80 to 85 ft. deep, the carbonic rises to a height of about 18 ft. from the surface, and the whole bottom of the valley is devoid of vegetable and animal life, and is strewn here and there with the bleached bones of man and other animals that have unluckily stepped within the deadly circle. A dog thrown in dies in 14 seconds; and birds attempting to fly across the valley, instantly drop down dead. In the neighborhood of the lake of Lsach, in Rhenish Prussia, the amount of C. A. evolved every day has been estimated at 600,000 lbs. weight. In a state of combination, C. A. forms an ingredient in a great number of minerals called *carbonates*, such as chalk, limestone of various kinds,  $\text{CaCO}_3$ , black-band iron-stone (carbonate of iron,  $\text{FeCO}_3$ ), malachite (carbonate of copper,  $\text{CuO.H}_2\text{O} + \text{CuCO}_3$ ), etc. C. A. is the principal product of combustion; the carbon of the burning substance (coal, candle, coal-gas, wood, paper, etc.) uniting with the oxygen of the atmosphere, and forming C. A. ( $\text{CO}_2$ ). It is also a product of respiration (q.v.), and is evolved more or less largely by all animals, not only by the mouth, but in exhalations from the skin, and is present in blood, urine, etc. It is evolved during the fermentation (q.v.) of beer, wine, etc., and often remains in brewers' vats when the liquor has been drawn off. During the decay of vegetable and animal matter, C. A. is produced, and in explosions of fire-damp in coal mines, it is formed in large quantity, and fills the underground passages.

C. A. forms the largest ingredient in the food of vegetables, and is therefore abstracted in large quantity from the air by plants. It enters into combination with the majority of the oxides of the metals and other compounds, to form a class of salts called *carbonates*, several of which have been referred to. C. A. when present in a vessel in quantity may be recognized by the power of extinguishing a lighted candle, or by not burning itself. C. A. in the form of gas may be readily recognized in the atmosphere by exposing a little lime-water in a saucer, or other shallow vessel, when the lime,  $\text{CaO}$ , abstracting the C. A. ( $\text{CO}_2$ ) from the air, a white film of carbonate of lime or chalk,  $\text{CaCO}_3$ , is formed on the surface of the liquid. A solution of baryta (q.v.) in water is more delicate in its action on the C. A. of the air, and more readily indicates its presence.

**CARBONIC OXIDE** is a compound of one atom of carbon and one atom of oxygen, is represented by the symbol  $\text{CO}$ , and has the atomic weight 28. It does not occur naturally, but may be observed burning with a pale-blue flame in fireplaces and stoves, especially in frosty weather. During the combustion of the fuel at the lower part of the grate, the oxygen of the air unites with the carbon of the fuel to form carbonic acid,  $\text{CO}_2$ ; and this gas rising up through red-hot coal or carbon, C, has part of its oxygen abstracted by the carbon, and two atoms of C. O. ( $\text{CO}$ ) are produced, which, taking fire on the top of the coals, burn with the characteristic blue flame, abstracting more oxygen from the air, and re-forming carbonic acid,  $\text{CO}_2$ . C. O. can be prepared for experimental purposes by heating a mixture of oxalic acid,  $\text{H}_2\text{C}_2\text{O}_4$ , and sulphuric acid,  $\text{H}_2\text{SO}_4$ , in a retort, when the latter abstracts the water from the oxalic acid, and the other elements,  $\text{C}_2\text{O}_3$ , escape as carbonic acid,  $\text{CO}_2$ , and C. O. ( $\text{CO}$ ). On passing the mixed gases through a solution of potash,  $\text{K}_2\text{O}$ , the carbonic acid is retained as carbonate of potash,  $\text{K}_2\text{CO}_3$ , whilst the C. O. remains as gas. C. O. is a transparent, colorless gas, a little lighter than air, being 967, and has recently been liquefied and solidified. It burns with a blue flame, but is a non-supporter of combustion, and at once extinguishes a lighted candle introduced into it. It is very poisonous, and even when largely diluted with air, if inhaled, it produces a sensation of oppression and tightness of the head, and ultimately acts as a narcotic poison. It does not take part in any natural phenomena, nor is it put to any use in the arts and manufactures, and in these respects, affords a striking contrast to carbonic acid, which has so many duties to perform in nature and in the arts.

**CARBONIFEROUS LIMESTONE**, or **MOUNTAIN LIMESTONE**, one of the lower rocks of the carboniferous system, generally of coralline formation, containing magnesia, and rich in organic remains. Some varieties make good building stone.

**CARBONIFEROUS SYSTEM**, the name given to the strata which, in geological order, rest upon the Devonian measures, and are capped by the Permian series. They derive their designation from the amount of carbon contained in them, for to them the great coal-fields of the world belong. In an economic sense, they are the most valuable series of rocks in the earth's crust, forming the great store-house from which is obtained the chief supply of coal, iron, and lime.

The rocks of the system are composed of a vast series of beds of sandstone, limestone, shale, and coal. In some coal-fields, these are so interstratified, that it is impossible to subdivide the strata in the order of time. In the Edinburgh district, there are nearly 100 coal-seams, omitting all under 6 in. in thickness. Out of the whole depth of the strata, amounting to about 6,800 ft., these seams occupy only 204 feet. The remainder consists of sandstone and shale in the upper half; towards the middle, limestones appear, and these increase downwards in the number and thickness of the beds, but are still intermixed with seams of coal. The same arrangement exists in the other coal-fields of Scotland, as well as in those of the n. of England. In other districts, the limestone is confined to the lower portion of the measures, and separated from the coal-bearing strata, so as to form a natural subdivision of the system into—1. *The coal measures*, consisting of shale, sandstone, and grit, with occasional seams of coal; and 2. *The mountain or carboniferous limestone*, a calcareous rock, containing marine shells and corals, and devoid of coal. A coarse quartzose sandstone, passing into conglomerate, is occasionally developed to a considerable extent between these two divisions. This is a local deposit, being almost confined to England, and may be considered as one of the coal sandstones, of coarser texture than usual. Being occasionally used for millstones, it is called *millstone grit*. It is accompanied with shales containing the usual coal plants, but generally without any true coal seams. Another locally developed series of beds, consisting of indurated shales, sandstones, and grits, occurs below the carboniferous limestone in South Wales and Ireland, and is known as the *lower limestone shales*. These rest conformably on a series of yellow sandstones, which have been generally referred to the Devonian measures, but which, from their organic contents, as well as from their stratigraphical position, seem to be basement beds of the carboniferous series. The existence and development of these various beds in the United Kingdom will be better understood by an examination of the following table. The maximum thickness of the beds is given in feet when known; the blanks show the absence of the division from the particular coal-field:

	Edinburgh.	Glasgow.	N. York.	Derby.	S. Wales.	Kerry.	Clara.	N. Ireland.
Coal Measures.....	6,800	2,800	2,000	2,700	12,000	2,000	2,900	2,200
Millstone Grit.....	.....	.....	400	1,600	1,000	.....	.....	1,800
Mountain Limestone.....	.....	.....	1,650	1,000	1,500	1,500	2,000	6,400
Lower Limestone Shales.....	.....	.....	.....	.....	500	4,650	150	1,200
Yellow Sandstone.....	.....	.....	.....	.....	.....	2,000 unknown depth	.....	2,000

In the midland countries, the coal measures are the only portion of the C. S. present, and these rest on the Silurian or older rocks. In Devonshire, there occurs an extensive series of shales and sandstones, with a few beds of earthy anthracite or culm, associated with argillaceous rocks, probably belonging to the lower limestone shales, much indurated, and traversed by slaty cleavage.

From the great economic value of the contents of the C. S., we are better acquainted with its fossils than with any fauna or flora that flourished before the tertiary epoch. As coal is the result of the mineralization of vegetable matter, the coal measures must necessarily abound in the remains of plants. No less than 294 species have been described as found in Britain alone. Numerous impressions of plants, as well as traces of structure, are found in the seams of coal themselves; but the more distinct forms are preserved in the interstratified beds of mud and ironstone, often in great number and exquisite beauty. Such remains consist chiefly of impressions of leaves separated from their branches; of casts of trunks, more or less in a broken state; and of roots much compressed, yet occupying their original position in the clay soil now indurated into shale; with these occur pieces of wood, or remains of trees, in which the vegetable texture is to some extent preserved. The great proportion of the plants seem to have flourished in marshy swamps, and to have accumulated where they grew, like peat, the material afterwards converted into coal. Hence a stratum of shale in which are imbedded the roots of sigillaria, calamites, etc., is the invariable *floor* on which the coal seam rests. The chief coal plants are lepidodendron (q. v.), sigillaria (q. v.), calamites (q. v.), trigonocarpon (q. v.), and ferns (q. v.). The existence of cone-bearing trees during this epoch has been proved from the microscopic examination of prepared sections of fossil woods, in which the small discs occur that are characteristic of and peculiar to the coniferæ. See *illus., COAL AND ROCK SALT*, vol. IV.

The animal remains are as numerous and as well preserved as the vegetable. They are found chiefly in the limestone; the greater part, indeed, of this rock, is made up bodily of corals and crinoids. No other such accumulation for extent and variety is known; it has its nearest parallel in the somewhat similar formation now going on in the southern archipelago. The corals and crinoids were specifically as well as individually numerous. The terebratulæ and other allied forms of bivalve shells, though belonging to a comparatively limited number of genera, were very abundant. The more highly developed mollusca were also numerous; they belonged to a great number of

generic types. But the most remarkable group was the fishes. At no time were they more abundant. They belonged to the ganoid and placoid groups of Agassiz. The ganoids, having their entire surface covered with scales, were numerous; some of them inhabited shallow water near the shore, and fed on crustaceans and shell-fish, for crushing which they had a formidable apparatus of conical teeth of a very complicated structure. Others were inhabitants of deep water, and were more powerful and predaceous, and more rapid in their movements. Their jaws were produced into a long snout, like the crocodile of the Ganges, and armed with a double series of enormous teeth, which were sometimes as much as 4 in. long by 2 in. broad, as in *megalichthys* (q.v.), dimensions rarely attained even by the largest known reptiles. Associated with these were a great number of sharks belonging to the *cestraciontidae* (q.v.), a family of which we have only a single living representative. They were furnished with a long bony spine to strengthen the dorsal fin, and thus enable them to turn speedily in the water, as they required to do in seizing their prey. These spines are often found fossil. The only remains referred to a higher division of the animal kingdom yet found belong to the *saurian archegosaurus* (q.v.). The larger part of the great coal fields of the world belong to this system of formation. In this country, coal is widely distributed over Pennsylvania, Ohio, Illinois, Kansas, Virginia, and other states. It is estimated that there are 400,000 sq. m. of the earth's surface now covered by productive coal fields. Now as there are about 8,100,000 sq. yards in a m., and as a cubic yard of coal weighs nearly a ton, and as in some of the fields the vein or deposit is from 80 to 60 ft. thick, there would not seem to be any immediate danger of failure in the supply of coal. See **ANTHRACITE**, and **COAL**.

**CARBON PRINTING.** See **POSITIVE PRINTING**.

**CARBOY**, a large glass bottle, cased in wicker, or protected by a wooden box, used to contain acids or other corrosive liquids, such as sulphuric acid (oil of vitriol). A carboy of sulphuric acid contains about 160 pounds of that acid.

**CARBUNCLE**, a name given by lapidaries to the beautiful mineral called *pyrope* (q.v.) by mineralogists. The C. of the ancients appears to have been either *pyrope*, or the deeper variety of noble garnet (see **GARNET**), which is in every respect very similar to it, or probably included both.

**CARBUNCLE** (Lat. *carbunculus*, a little coal) derives its name from the two prominent symptoms—a glowing fiery redness, and a burning pain. It consists of an inflammation, caused by some vitiated condition of the blood, or some atmospheric influence, attacking a patch of skin on the shoulders, nape of the neck, or indeed on any part of the body. The part swells slightly, feels hard, and this hardness extends deeply into the tissues; the pain is very severe, and the patient much depressed with loss of appetite, and general derangement of the secretions. As the disease advances, the redness assumes a dark purple or livid hue, the cuticle rises in blisters, and many small specks of matter appear on its surface, which discharge, and leave apertures like those in the rose of a watering-pot; through this a thin viscid fluid escapes, and occasionally a small slough or core of the true skin which has been killed by the disease. Sometimes these apertures meet, forming large openings, and in others the whole patch of skin sloughs and comes away.

The treatment of C. consists in restoring the secreting organs to a healthy condition, the agents for which must depend on the individual case; in supporting the patient's strength by easily digested food, wine, brandy and bark, with nitric acid; relieving pain by opiates, and encouraging suppuration with warm poultices; carrot, turnip, and yeast poultices being favorite applications in this disease. To prevent excessive loss of skin, the C. must be divided freely with a knife from one margin of the inflamed patch to the opposite one.

**CARBURETS.** See **CARBIDES**.

**CARBURETED HYDROGEN** is a term in chemistry applied to several compounds of carbon and hydrogen. Thus, light carbureted or monocarbureted hydrogen,  $\text{CH}_4$ , is the gaseous compound popularly known as marsh gas and fire-damp, and is the principal constituent of coal-gas. See **GAS**. Heavy carbureted or bicarbureted hydrogen,  $\text{C}_2\text{H}_2$ , is otherwise known as olefant gas (q.v.).

**CARCAGENTÉ**, a t. of Valencia, Spain, about 28 m. s.s.w. of the city of Valencia, situated on a rich plain near the right bank of the Juncar. It is well built, with good streets, and has a palace belonging to the marquis of Calzada. It has some manufactures of linen and woolen, and a trade in the agricultural produce of the district. Pop. about 12,500.

**CARCANET**, a jeweled chain or necklace. Venice was famous for the manufacture of carcanets in the 15th century.

**CARCASS**, in military pyrotechny, is a hollow case of iron, sometimes globular, and sometimes ovate, filled with combustibles. It is fired from a mortar. Its chief use is to ignite buildings in the enemy's quarter, and to give sufficient light to aim the shot and shells. Carcasses are said to have been first used by one of the princely ecclesiastics of Germany, the bishop of Munster, when he fought against the duke of Luxem-

bourg at Groll, in 1672. The oval carcasses, being uncertain in their flight, are now nearly abandoned.

Carcasses are not intended to burst, but to send out, through holes, a furious and inextinguishable fire, which lasts from 8 to 12 minutes. The composition with which they are filled consists of saltpeter, sulphur, meal gunpowder, pitch, rosin, tallow, and Venice turpentine, about half being saltpeter. The composition is packed in tightly through one of the holes; and the holes are stopped with fuses adjusted to ignite the composition after a certain space of time. Sometimes old pistol barrels, loaded to the muzzle, are introduced with the composition. Compare those details with **CASE-SHOT**, and **SHELLS**.

**CARCASSONNE**, a t. in the department of Aude, France, situated on the river Aude, and the *Canal du Midi*, about 55 m. s.e. of Toulouse. It is divided into two parts, the old and new towns. The modern town is well built, with streets running at right angles to each other, squares adorned with trees, pleasant boulevards, and several marble fountains. The old town, built on a height, is much more picturesque, with its ramparts and towers, some parts of them dating from the time of the Visigoths, and the rest, with the castle, from the 11th or 12th century. This old town suffered greatly at the hands of the fierce bigot Simon de Montfort and his crusaders, who here burned 400 of the Albigenses. In the 14th c. it effectually resisted the black prince. The cloth manufactures are important, employing a large number of operatives. C. has also manufactures of paper, leather, linen, and soap. Pop. of commune, '91, 28,235. The ancient name of the town was Carcaso, which was a place of some note in the time of Cæsar.

**CARCHARIAS**. See **SHARK**.

**CARCHEMISH**, an ancient city frequently mentioned in the Scriptures as the capital of the Hittite nation. Biblical scholars were formerly inclined to look upon it as the classical Circesium, but recent Assyriological investigations have identified it with the modern Jerablûs or Jerablîs, a village on the Euphrates river not far from Biredjek. The period of its greatest splendor was abt. B.C. 1100-850. It seems to have been the birthplace of that modified type of Assyrian art which specially characterizes the early monuments of Asia Minor.

**CARCINOMA**. See **CANCER**.

**CARDAMINE**. See **CRESS**, **BITTER**.

**CARDAMOMS** are the capsules of certain species of plants of the natural order *scitamineæ* (q.v.), and belonging to at least two genera, *amomum* and *eleteria*. They are three-celled, and contain numerous wrinkled seeds, which form an aromatic pungent spice, weaker than pepper, and with a peculiar but agreeable taste. On account of their cordial and stimulant properties, they are employed in medicine, very generally to qualify other medicines; they are also used in confectionery, although not to a great extent in Britain; but in Asia they are a favorite condiment; and in the n. of Germany, they are used in almost every household to flavor pastry.—The C. recognized in the British pharmacopœias, and called *true* or *official* C., also known in commerce as *Malabar C.*, are the produce of *eleteria cardamomum*, a native of the mountains of Malabar and Canara. They depend for their qualities on a peculiar pungent essential oil, called *oil of cardamom*, which may be obtained from them by distilling them with water, and when fresh, is colorless. Other kinds of C. occur in commerce, but none is equal to the true C. in commercial value. The different kinds of C. differ not only in strength, but in the character of their aroma. The plants producing them have much general similarity.

**CARDAN**, **JEROME**, a celebrated mathematician, naturalist, physician, and philosopher, b. at Pavia, Sept. 24, 1501, was the illegitimate son of a physician and jurisconsult at Milan. He received his early education at home, and completed his studies in Pavia and Padua. After some years, he became professor of mathematics at Milan. Here his reputation began to grow. After a few years, he began to lecture on medicine, to the practice of which he ultimately betook himself. By 1546, his reputation had so increased, that he was invited by the king of Denmark to accept a professorship at Copenhagen, which, however, he declined; and, in 1553, we find him proceeding to Scotland, on an invitation from Hamilton, primate of that country. He managed to cure the primate of an inveterate asthma, which had defied the skill of the most celebrated physicians, and returned to Milan enriched by the bounty of his patient. Here he again settled for some time. In the autumn of 1559, however, he removed to Pavia as professor of medicine, whence, again, in the same capacity, he removed to Bologna, where he continued teaching till 1570, when we find him imprisoned for debt. Having regained his liberty in 1571, he went to Rome to avoid his creditors. Here he was speedily admitted a member of the medical college, and pensioned by pope Gregory XII. The rest of his life he spent, without public employment, in Rome, where he died Sept. 2, 1576, a few weeks after finishing his autobiography. Some writers assert, but on no sufficient authority, that he starved himself to death, to fulfill a prediction which he had made as to the time when he should die. It is certain, however, that he was a devoted astrologer, and cast horoscopes for himself and others. The fancifulness necessary to

support the faith of an astrologer imbued all his scientific writings. These were very voluminous. A summary of his notions on physics and metaphysics is given in his two works—*De Subtilitate*, in 21 books, and *De Rerum Varietate*, in 17 books. On the whole, he wrote 123 treatises on physics, mathematics, astronomy, astrology, rhetoric, history, ethics, dialectics, natural history, music, and medicine. These, it need scarcely be said, abound in incoherent paradoxes, contradictions, and capricious abstractions, more than enough to overwhelm the few profound ideas which he originated. A formula for the solution of certain kinds of cubic equations is called "Cardan's formula," and was published by him, as his own invention, in the *Ars Magna sive de Regulis Algebraicis* (1545); but it would appear that the formula was really the invention of one Tartalea or Tartaglia. In religion, C. was heterodox, and commonly reputed an atheist. His numerous writings were collected and edited by Charles Sphou (10 vols., Lyon, 1663).

**CARD-BOARD**, or **CARD**, is made by pasting together several layers of paper, according to the thickness and quality required. *Bristol-board*, used by artists, is made entirely of white paper; ordinary card-board, of fine white paper outside, with one or more sheets of coarse cartridge-paper between. According to the number of layers, they are called *three, four, six, or eight sheet* boards. *Mill-board*, used by book-binders as the basis of book-covers, is made of coarse brown paper, glued and strongly pressed.

The workman arranges the paper in the order required for pasting, and the pile, called a *head*, is placed at his left hand, the paste-tub on his right. He lifts a sheet from the head with his left hand, brushes it over with paste with his right; then another is laid upon that and pasted, until he comes to the last required to complete the thickness of one board, when he removes two sheets, and only pastes the upper one, which thus forms the lower sheet of another board. This is repeated till the whole head is pasted, when it is removed to a press, and the water of the paste squeezed out at the edges. The boards are then separated, and dried by hanging them in a room artificially heated. The card-board, which is now rough and warped, is smoothed and flattened by making a pile consisting alternately of sheets of rough card-board and copper plates, with a copper plate at top and bottom. This pile is passed between iron rollers, and the smooth surface of the copper impressed upon the card-board, which is thus flattened and beautifully polished.

The enameling of address-cards is produced by brushing over the card-board a mixture of *china* or *krennitz white* (a fine variety of white lead) and size. After drying, this surface is rubbed lightly over with a piece of flannel, previously dipped in finely powdered talc; it is then polished by rubbing vigorously with a hard, close-set brush.

**CARDENAS**, a seaport and city of Cuba, capital of a district, 105 m. e. of Havana, on a bay of the n. coast, and having railroad communication with Matanzas and Havana. There is a good anchorage in the harbor. Sugar is the chief article of export. The streets are well laid out and lighted, and the houses are usually neat and solid. There is a bronze statue of Columbus in one of the squares. Much of the business is done by people from the United States, a fact that gives it the name of the "American city." In 1850, the city was plundered by Narciso Lopez (q. v.). Pop. '92, 23,680.

**CARDIA**, the upper orifice of the stomach, called, on account of its vicinity to the heart, by the same Greek name, *cardia*, and probably hardly distinguished from it in the earliest times of Greek medicine.

**CARDIAC MEDICINES**, stomachic and stimulating remedies—cordials, so called from their action on the heart through the stomach. See **CARDIA**.

**CARDIADÆ**, a family of bivalve lamelli branchiate mollusks, of which the cockle is a specimen.

**CARDIALGIA**, pain of the heart or stomach (**CARDIA**). The name is commonly applied to the particular variety of pain called *heartburn*, arising from a disordered stomach, and accompanied with acid eructations. See **INDIGESTION**.

**CARDIFF** (*Caer-Taff*, Fort of the Taff), a parliamentary and municipal borough and seaport, one of the county towns of Glamorgan, South Wales, situated on the river Taff, 170 m. w. of London by railway. The population, which was about 1,000 in 1801, was estimated at 162,660 in 1896. C. with Cowbridge and Llantrissant, returns one member to parliament. The town extends about one mile in each direction from the town-hall. Among the public buildings are the Glamorganshire and Monmouthshire Infirmary, town-hall, free library and museum, county jail, law-courts, an infirmary, a county lunatic asylum, baths, and a theater. There are also many private buildings of a superior character, and a public park. Of the numerous places of worship in C., only a few belong to the church of England. South Wales College is at C.

The port of C. is the outlet for the large mineral and manufactured produce of the central portion of the South Wales mineral-field, in which are the populous districts of Merthyr-Tydvil, Rhymney, Aberdare, and the Rhondda valley, with which this port is connected by the Taff Vale, the Rhymney, and the Ely Valley railways, and the Glamorganshire canal. The town is also one of the chief stations on the Great Western line from London to Milford-Haven. The Bute docks, e. and w., with an area of 76 acres, constructed at the expense of the Bute estate, have cost upwards of a million sterling.



There are several other docks and basins in addition to a floating dock with a lifting power of 4,500 tons and many dry docks. Since the '60's the progress of the town has been very rapid, owing chiefly to the trade in the steam coal obtained in the vicinity. The export of coal for the coasting trade increased from 899,000 tons in 1885 to nearly 1,300,000 tons in 1891. In the same years the export of coal to foreign countries increased from 1,451,000 tons to 10,115,000 tons. There is a considerable trade in iron and tin plate and the city has iron shipbuilding works, extensive iron and steel plant and many factories.

The assizes (half-yearly, alternately with Swansea) and the quarter-sessions are held at the town-hall. The ancient city of Llandaff, now a mere village, is almost connected with Cardiff. Cardiff castle, built in the 11th c., is now partly in ruins and partly occupied by the marquis of Bute, to whom nearly the whole of the modern town belongs. Robert duke of Normandy, brother of Henry I., died in the castle after being a prisoner for 28 years.

During the Civil War Charles I. visited Cardiff and the castle was alternately in the hands of the royalists and the parliamentarians. In 1648 Cromwell got possession of it after a bombardment lasting three days, and he afterward, as an example to his soldiery, hanged the man who had betrayed the city to him. In the latter part of the 17th century the inhabitants of Cardiff complained very much of the competition of the neighboring town of Caerphilly, but the latter soon decayed, while Cardiff advanced in prosperity. Yet at the beginning of the 19th century it had a population of only about 1,000. The transportation was carried on in a very primitive manner and only vessels of small tonnage could enter the port. The opening of the Glamorganshire canal greatly advanced the commercial prosperity of the city, but a still greater impetus to progress was the construction of the docks and basins.

**CARDIFF GIANT**, a rude statue of a man 10½ ft. high, cut (in Chicago) from a block of gypsum sent from Iowa. It was secretly buried near the village of Cardiff, Onondaga co., N. Y., where it was pretended to have been found in Oct., 1869, and was exhibited with great success for several months as "the petrified giant," deceiving even some men of science. The fraud, one of the most notable in recent times, was finally confessed.

**CARDIGAN** (anciently, *Aberteifi*, Mouth of the Teify), the co. t. of Cardiganshire, a parliamentary and municipal borough and seaport, in the s. w. corner of the county, on the right bank of the Teify, 3 m. from its mouth, and 239 m. n. by w. of London. The vicinity exhibits romantic scenery on the Teify, and grand rocks on the coast. The streets, except the chief one, are narrow and steep, the houses built of slate-rock. Population of the municipal borough in 1891 was 3447. With Aberystwith, Lampeter, and Adpar, C. returns one member to parliament. Vessels of 400 tons reach the town by spring-tides. C. became an important town about the Norman conquest. The Normans were frequently defeated before mastering it. There are the remains of a castle on a low cliff on the Teify, which is supposed to have been founded, in 1160, by a Norman baron. The town suffered much in the struggles between the Welsh and the Normans. The Teify is said to have been the last British resort of the beaver.

**CARDIGAN, JAMES THOMAS BRUDENELL**, 7th earl of; also baron Brudenell, lieut. gen.; 1797-1868. He was educated at Oxford, and went into parliament in 1818. In 1824, he entered the army in the hussars, and rose (1832) to be lieut. col. He was overbearing and quarrelsome, and treated his men with great severity, so that out of a regiment of 850, he made within two years 700 arrests, and held 105 courts-martial. In 1837, he succeeded to the peerage. In 1840, he fought a duel with Capt. Tuckett, an officer of his regiment, in which his adversary was wounded. The house of lords subjected the earl to a show of trial, and he was acquitted. The Crimean war sent him to the field as commander of the light cavalry, and he led that body of 600 through the desperate charge at Balaklava, cutting his way through six times the number of Russian heavy cavalry, but leaving half his men dead or wounded on the field. This charge, celebrated in Tennyson's poem, was desperate and brilliant work, but in the opinion of many critics a wanton and needless sacrifice of his men. In 1861, he was made lieut. gen. He left no children, and the titles passed to his relative, the marquis of Ailesbury.

**CARDIGAN BAY**, a semicircular bend of St. George's channel, on the w. coast of Wales, 45 m. wide from n. to s., and 20 m. deep, with a sweep of coast of 110 miles. Its exterior points are Brach-y-Pwll, off which lies Bardsey Isle, in Caernarvon, and Sturm Head, in Pembroke. It receives the rivers Mawddach, Dovy, Ystwith, Yren, and Teify. It has 8 to 30 fathoms water, with three reefs. A strong current sweeps round the bay from s. to north. Almost all the harbors on the coast are obstructed by bars. A great part of C. B. is said to have been once dry land, protected, as Holland now is, by dams and dikes, and containing 16 towns, and the land is said to have been submerged about 520 A. D.

**CARDIGANSHIRE**, a maritime co. in South Wales, on Cardigan bay, with an area of 692 sq. m., a half being waste. The surface is hilly, interspersed with fertile valleys. A rugged, bleak range of hills runs through the middle of the co., from the s. w. to the n. e., between the coast and the Teify, ending abruptly in a shelving beach in the middle

of the coast, but on other parts there are rich flat tracts. The co. contains little wood. The chief rivers are the Teify, which rises in a small lake near the center of the co., and runs 70 m. s.e. and e. along the s. border of the co., the Claerwen, Ystwith, and Rheidol. C. contains some romantic water-falls, especially the Rheidol falls and the Devil's bridge, and above 20 small lakes or llyns, noted for their wild beauty. C. reposes on lower Silurian slates and shales, containing few or no organic remains. Rich veins of copper, lead, zinc, and silver occur. The climate is cold and wet, but mild though wet on the coast. Snow lies long on the hills in winter. Summer is delightful in the valleys. C. is an agricultural co., and its chief branch of industry is the rearing of live-stock. The chief crops are oats, barley, and potatoes on the poor clay and peat soils of the mountains, and wheat, barley, and potatoes on the flat loams of the coast and valleys. The cattle and horses are small. There are some manufactures of coarse woollens and gloves, stockings, and hats. Oats, barley, cattle, sheep, pigs, butter, slates, and woollens are exported. Cardigan is the co. town; the other chief towns being Aberystwith, Lampeter, Adpar, Aberayron, Tregaron. C. sends one member to parliament. Pop. '71, 62,712; in '91 it was 83,467. In 834, the king of C. became king of all Wales, under the title of Roderick the great. He divided Wales among his three sons. After this, the Danes and Normans overran Cardiganshire. The co. has many remains of British and Roman camps and roads, Druidical circles, cairns, and castles. Many Welsh princes and bards were buried in the abbey of Strata Florida, 16 m. s.e. of Aberystwith, and some of the records of the principality were kept here. In C. there is a curious practice of sending presents (*biddings*) to a new-married couple, which, when sold, often realize £50 or £60.

**CARDINAL** (Lat. *cardinalis*, principal, from *cardo*, a hinge). Cardinals are the highest dignitaries in the Roman church after the pope, whose electors and counselors they are. The title, however, had at first a more general application. The pope being the sovereign bishop over the whole Romish church, and having, as such, many duties to fulfill inconsistent with those of a particular diocese, had, from very early times, a number of bishops, priests, and deacons whom he appointed his vicars and coadjutors for the management of the diocese of Rome. The bishops exercised the episcopal function in the pope's stead, each having a peculiar church within the diocese. The priests were titular parsons of the churches in the city of Rome, and had the cure of souls. The deacons had charge of some churches and chapels of devotion, which they held as deaconries, with the additional duty of assisting the pope when he officiated in public. These three classes of ecclesiastics were called *cardinati* or *cardinales*, to denote that they were the first or chief over the rest, and that all the affairs of the diocese of Rome were under their direction. At a subsequent period, the priests and deacons of other cities of importance assumed the title of C., to distinguish them from other priests and deacons over whom they claimed supremacy; but the popes subsequently ordained that none but those whom they had chosen should be honored with that title. Amongst those whom the popes thus appointed were the seven bishops *suburbicarii*, who took their titles from places in the neighborhood of Rome. These bishops were called *hebdomadarii*, because they attended the pope for a week each in his turn. These cardinals took part with the Roman clergy in the election of the pope, who was generally chosen from their number. About the beginning of the 12th c., the popes having formed a regular court, began to bestow the rank of C. priest or C. deacon on any individual of the clergy, or even of the laity, whom they chose to select; and to each, whether Roman or foreign, they gave the title of some particular church in Rome, but without attaching to it any obligatory service. Thus the cardinals became a separate body elected for life and the officiating priests of the Roman parishes were gradually deprived of the title. In 1159, Nicholas II. limited the right of election to the popedom to the cardinals thus appointed, leaving to the rest of the clergy and people of Rome merely the right of approving of the election of a new pope, and to the emperor that of confirming it. Even these prerogatives, in course of time, were withdrawn. Notwithstanding the great powers thus intrusted to them, the bishops in the great councils of the church continued to take precedence of the cardinals; and it was not till 1614 that Louis XIII. of France, in the sitting of the parliament of Paris, adjudged precedence to the cardinals over the ecclesiastical peers—bishops and abbots. The power of the popes to appoint cardinals has often been contested, and their right to precedence denied, by the other dignified ecclesiastics. In 1567, pope Pius V. forbade any clergyman not appointed by the pope to assume the title of C.; and Sixtus V., in Dec., 1586, fixed their number at 70—viz., the 6 bishops *suburbicarii*, 50 priests, and 14 deacons, and on this footing they have since remained, though the number is seldom complete, the pope generally leaving some vacancies for extraordinary cases. The number has frequently fallen greatly under 70. When Nicholas III. was chosen pope, there were but eight cardinals; and a little before the death of Alexander IV., there were but four. Sometimes before Sixtus V. the number was exceeded, as in the pontificate of Pius IV., when there were 74. The body of cardinals is styled the sacred college. Most of the cardinals reside in Rome, and either enjoy ecclesiastical benefices, or are employed in the administration. When not so provided for, the cardinals receive an allowance of 100 dollars monthly from the papal treasury. Some cardinals belong to monastic

orders, and reside in their convents even after their election. The jurisdiction of the C. bishops in the place in which they are established is truly episcopal, but they are not obliged to reside. That of the C. priests and deacons is almost episcopal, but extends no further than the church and sacristy. They have there an episcopal seat under a canopy, like bishops, and they there solemnly give the people their blessing. The creation of cardinals is wholly in the pope. If the new-created C. is at Rome, he goes the same day to visit the pope, who puts the red cap on his head. The red hat, which Innocent IV. ordained that cardinals should wear, to show that they ought to expose themselves to the shedding of their blood in the cause of the church, is afterwards given in a public consistory. A number of symbolical ceremonies accompany this investiture. The cardinals that are absent, when chosen, have the cap sent them by a special messenger from the pope. The hat is given by the pope's own hands; and many cardinals who do not visit Rome, die without ever having received it. The only exception is in favor of members of royal houses, to whom the hat is sent. Pope Urban VIII., in 1630, gave to the cardinals the title of eminence, which they shared with the grand-master of the order of Malta, and the ecclesiastical electors of the German or Roman empire. The pope often employs cardinals as ambassadors, and the individual thus employed is styled *legate a latere*. A C. legate acts, or recently acted, as governor of the northern provinces of the Papal states, which thence received the name of legations. The chief secretary of state, the *camerlengo* or minister of finances, the vicar of Rome, and other leading officials, are always chosen from among the cardinals. The council of cardinals, when assembled under the presidency of the pope to discuss matters of church and state, is called the consistorium. There are public consistories, which are held on great occasions, and correspond to the levees of other sovereigns; and private and secret consistories, which are the privy council of the pope. Moreri's *Dictionary*, *vices Cardinal*, contains a list of cardinals from 1119 to 1724, with their names, countries, etc., and the dates of their election and death. See *illus.*, PRIESTS, MONKS, AND NUNS, vol. XII.

**CARDINAL BIRD**, or **RED BIRD**, *Guarica cardinalis*, also called cardinal finch, cardinal grosbeak, and Virginian nightingale, one of the finest song-birds of America, belongs to the family of *fringillida*, and differs from the true grosbeaks (*coccothraustes*) in having the beak slightly bulging. The general color of the male is red, the head being vermilion, and only a small portion of the plumage around the base of the bill being black. The feathers of the crown are long, and erected into a conical crest, like a red cap. The C. B. abounds in Texas, Florida, and the southern states of America generally, migrating northwards in spring, but never further than Massachusetts, where only a few stragglers are seen. Its loud, clear, sweet, and varied song is to be heard chiefly in the mornings and evenings.

**CARDINAL FLOWER.** See LOBELIA.

**CARDINAL NUMBERS;** **CARDINAL POINTS,** **CARDINAL SIGNS,** **CARDINAL WINDS.** The numbers which answer the question, "How many?" i.e., one, two, three, etc., are C. *numbers*. The C. *points* of the horizon are the N., S., E., and W. points; the two former are the points in which the meridian cuts the horizon near the north and south poles of the heavens respectively; the two latter those in which the prime vertical cuts the horizon near the points where the sun rises and sets respectively. The C. *signs* of the zodiac are Aries, Libra, Cancer, and Capricorn. The C. *winds* are those which blow from the C. points of the horizon.

**CARDINAL VIRTUES** (Lat. *cardinales*, chief, from *cardo*, a hinge). The C. V. of the ancients were justice, prudence, temperance, fortitude. They were so called because the whole of human virtue was supposed to hinge or turn upon them. In other words, they were considered as a full and comprehensive classification of man's various duties.

This mode of dividing the virtues is to be found as far back as Socrates. The ancient moralists treated under ethics the whole sum of human duty and virtue. Thus, Aristotle considers the great problem of the science to be the determination of man's highest good, together with the means of realizing it. Hence, he includes both the social virtues and the prudential regard to the welfare of the individual in the same scheme. Of the four C. V., it will be seen that the first, justice, is the social virtue; that prudence (which, properly speaking, includes temperance also) regards the well-being of the individual; while fortitude is necessary to both. This last was a virtue greatly esteemed in the ancient world, each one's lot being much less secure than with us in the present day; it was impossible to say what sufferings might be in store for the most prosperously situated of men.

Dr. Whewell has made an attempt to correct the more obvious defects of the classification, and has substituted one which he deems free from those defects. The most notable omission, in the ancient scheme, judged from the modern point of view, is the absence of all reference, either expressly or by implication, to the virtue of goodness or benevolence.

Accordingly, to adapt the classification to the altered point of view, benevolence has to be added to the list. This is Dr. Whewell's first virtue; the others are justice, truth, purity, and order. But the scheme, as thus amended, is scarcely less objectionable than before. The virtue named last, order, which means obedience to authority, cannot but

contain a very large portion of all the rest; seeing that justice, truth, etc., are enjoined by positive law. Then, what is understood by purity, including the control of the two powerful appetites, hunger and sex, is partly prudential and partly social.

The ethical discussions of modern times may be very much aided, if we divide the totality of human virtue on the following plan. There are three distinct classes of human actions, which are all approved of or accounted virtuous, but on different grounds, and in a different manner.

1. There are actions which are forbidden by society under penalties; in other words, men are punished for committing them. Such are theft, breach of bargain, slander, violence to the person, and all the offenses against our fellow-men that are prohibited by the law of the land. The avoiding of all these actions is signified to be a part of our duty, by the suffering inflicted on the doers of them. The law fines, imprisons, or puts to death those who will not conform to its regulations.

The law of the land is not the only power that prescribes conduct enforced by penalties. The public opinion of the country at large forbids certain actions, and punishes transgressors by excluding them from social intercourse; such, for example, are acts of unchastity, more especially when committed by women. There are also codes enacted by particular societies, as the code of honor among gentlemen, which constitutes some actions offenses that are not so by law, or by universal opinion. Cowardice is one of the qualities most obnoxious to the code of honor.

The actions prohibited by law are obviously such as could not be allowed without the entire subversion of human society. If murder and theft were to go unpunished, the principal end for which men associate together in communities—that is, protection and security—would not be attained. It is impossible that we should not disapprove of all such actions, and approve of the contrary.

2. There are some actions that are accounted virtuous, while their opposites are not punished, as in the case of those now mentioned. Doing good to persons that have no claim upon us—in other words, benevolence or philanthropy—is considered highly praiseworthy; but the neglecting of this is not usually visited with any punishment or censure; so that if it be a duty to perform acts of benevolence, it is a duty generically different from paying our debts, and respecting the person and property of our neighbor. The motives brought to bear on the two cases are widely contrasted: in the one, we *punish* for doing the action forbidden; in the other, we *reward* for doing the thing enjoined, and inflict no punishment if that is neglected. Here lies the difference between *duty*, strictly so called, and *merit*. In the bare performance of duty there is no merit; a man would not even be commended for the punctual payment of his just debts, if it were not that many people are deficient in this respect, and in the comparison with these the correct person excites in our minds a feeling of satisfaction. *Disapprobation* is the sentiment properly concerned with duty, or rather, with breach of duty; *approbation* is bestowed on all who do something over and above their duty. This distinction is known in every department of practical life; while speculative moralists habitually lose sight of it.

3. The virtues included under prudence are in a different position from either of the foregoing classes. Bearing the common names, virtue and duty, by which they are recognized as worthy of approbation or commendation, they are nevertheless unaccompanied with the sanctions either of punishment or of reward. The imprudent man is subject to no legal penalty, unless he clearly involves other persons in his imprudence; and the prudent man is not rewarded with the praise, esteem, or other benefits conferred upon the benevolent man. It is true that the young are punished by parents or teachers for imprudences; and some governments take such a paternal care of their subjects, as to punish them for sins against themselves. Men have been sent to prison, because of their endangering their own salvation by embracing heresy; but at the present day, such a proceeding is considered beyond the function of government. Men and women, arrived at maturity, are expected to take care of their own interests; even if they do not, no one punishes them; if they do, no one rewards them. We have, it is true, a certain feeling of disesteem in the one case, and of esteem or commendation in the other; neither of which, however, attains any considerable strength until more than the individual's self is involved. In short, although we cannot divest ourselves of all sentiment as lookers on, when men behave prudently or imprudently, our rule is *non-interference*; and this constitutes a marked distinction between the self-regarding and the social vices and virtues.

Accordingly, when ethical writers are endeavoring to probe the foundations of the moral sense in man, they ought to consider separately those three different species of conduct, for the sentiment excited by each is marked by strong peculiarities. To class social duties enforced by punishment, social virtues stimulated by rewards, and prudence, which is accompanied by neither, under one common designation, and discuss them as if they were essentially the same, is to confuse, instead of clearing up, the first principles of morality.

In Roman Catholic systems of theology, there are declared to be four *cardinal virtues*—"prudence, fortitude, temperance, and justice"—from which all other "moral" virtues are represented as flowing. But there is a prior division of virtues into the two classes of *theological* and *moral*; the theological virtues being faith, hope, and charity.

The distinction between these two classes is represented as consisting in this, that the theological virtues "*immediately* regard God;" and the moral virtues do not immediately regard God, but are commanded and rewarded by God, and are beneficial to ourselves.

**CARDING OF COTTON**, etc., the process of disentangling and arranging in parallel rows the fibers of cotton. This operation may be compared to the combing and brushing of one's hair, and the *card* combines the properties of the comb and brush, being a brush with wire teeth instead of hairs. These teeth are inserted in strips of leather which are fixed upon the surface of a cylinder. Several such cylinders are arranged so that the ends of the teeth are nearly in contact; and the cotton being brought to them, is caught up, passed from one to the other, and combed out as the cylinders revolve in the form of beautiful films or fleeces, which are removed by a smaller drum-card, called the "doffer," and again from this by the "doffing-knife." These films, which are of the width of the drum, are next contracted to a narrow ribbon, by being passed through a funnel; and thus narrowed, are called the "card ends" or "slivers," and are now ready for the next process of "drawing" or "doubling." See **SPINNING**.

**CARDINIA**, a genus of fossil conchiferæ, containing 85 species, which extend from the Silurian to the inferior oolite. They have an oval or oblong shell, attenuated posteriorly, and marked with lines of growth, and an external ligament. They occur abundantly in the valuable layers of clay-ironstone called "mussel-bands." In Derbyshire, this material is wrought, like marble, into vases.

**CARDITIS**, or inflammation of the heart, a form of disease of very rare occurrence, if the term be limited in its application to cases of true acute inflammation of the muscular structure of the heart itself. C., however, was commonly understood in a wider sense, so as to include certain forms of disease of the external and internal lining membrane of the heart; and it is only since the beginning of the present century that, owing to the improvements in medical pathology and diagnosis, the names of pericarditis and endocarditis (q.v.) have come prominently into view as indicating the most ordinary inflammatory affections of the heart. See **HEART**, **DISEASES OF THE**.

**CARDIUM AND CARDIA'CEÆ**. See **COCKLE**.

**CARDO'NA**, a t. of Catalonia, Spain, about 44 m. n.w. of Barcelona. It is situated on a declivity on the right bank of the Cardener, is surrounded by walls, pierced with six gates, and commanded by a castle on a height. It is celebrated on account of a mountain of salt in its vicinity, which has a height of about 500 ft., and measures a league round. When the sun shines on this gigantic mass, the effect is of the most brilliant and gorgeous description. Pop. about 4000.

**CARDOON**, *Cynara cardunculus*, a perennial plant of the same genus with the artichoke (q.v.), a native of the s. of Europe and the n. of Africa. It very much resembles the artichoke, but is of larger size, whilst the flowers (heads of flowers) are smaller. It has long been in cultivation, for the sake of the blanched leaf-stalks and midribs of the leaves, which are used as a salad, or more generally as a boiled vegetable during winter.

**CARDS**. All that we know of C., for certain, is, that they are of ancient and eastern origin. What is asserted by count de Gebelin and the earliest writers upon the subject, that in their primary stage they constituted some sort of symbolic and even moral game, is not so well established. The Hindu and Chinese C. are, however, emblematic in a very high degree—the former illustrating the ten avatars, or incarnations of the deity Vishnu; and the so-called paper-tickets of the Chinese typifying the stars, the human virtues, and, indeed, almost anything you please. The learned sir William Jones expresses himself convinced that the Hindu game of *chaturaji*—the four rajahs or kings—a species of highly, complicated chess, was the first germ of that parti-colored paste-board which has been the ruin of so many modern fortunes. In the wardrobe accounts of Edward I., there is an item of money paid for the use of that monarch for playing at the four kings—"ad opus regis ad ludendum ad *quatuor reges*, viii. s. v. d."—which is supposed to have been a game at C.; but how and when painted C. took the place of carved figures, is still but matter of conjecture.

A pack of Hindustani C., in the possession of the royal Asiatic society, and presented to capt. Cromline Smith in 1815 by a high-caste Brahman, was declared by the donor to be actually 1000 years old. "Nor," quoth the Brahman "can any of us now play at them, for they are not like our modern cards at all." Neither, indeed, do they bear any remarkable resemblance to our own—the pack consisting of no less than eight suits of divers colors, the kings being mounted upon elephants, and the viziers, or second honors, upon horses, tigers, and bulls. Moreover, there are other marks by which the respective value of the common C. may be distinguished, which would puzzle our club quidnuncs not a little—such as "a pine-apple in a shallow cup," and "a something like a parasol without a handle, and with two broken ribs sticking through the top." In the Chinese dictionary, called *Ching-tee-tung*, it is asserted that dotted C. were invented in the reign of Seun-ho (1120 A.D.), and devised for the amusement of his numerous wives; there are 30 C. in each of these packs, 8 suits of 9 C. each, and 3 single C. superior to all the others. The name of one of the suits is *Kew-ko-wan*—that is to say, the nine ten-thousands of *kwan*, strings of beads, shells, or money; and the titles of the other two suits are equally con-







cise and significant. The Chinese C. have, however, a decided advantage over those of Hindustan in being oblong instead of circular.

C. do not appear to have been known in Europe until towards the end of the 14th century. "In the year 1379," writes Carelluyzo, "was brought into Viterbo the game at cards, which comes from the country of the Saracens, and is with them called *naib*." "Whence afterwards," says Mr. W. Chatto (*Origin and History of Playing Cards*, Lond., 1848), "perhaps Jackanapes, Jack of cards." This entry occurs in the accounts of the treasurer of Charles VI. of France, in 1398: "Given to Jacquemin Gringonneur, painter, for three packs of cards, gilt and colored, and variously ornamented, for the amusement of the king, 56 sols of Paris." From the date of this year being immediately subsequent to that in which the king lost his reason, the story goes that C. were invented to divert his royal melancholy; but they were certainly of earlier use in France. The French clergy took greatly to C. about this time; we are afraid, too, it was to the ungenteel game of all-fours, since we find them specially forbidden that amusement by the synod of Langres, in 1404.

Card-making became a regular trade in Germany 14 years after this, and it, as well as card-painting, seems to have been carried on for some time exclusively by females; the wood-engraving of C., however, did not begin until some time afterwards. The pips were then very prettily imagined, the suits consisting of hearts, bells, acorns, and leaves. The place of her majesty the queen was filled by a knight in those days; and it is to Italy, and not to Germany or France, that the glory of giving *place aux dames* must be conceded. There was also no ace whatever! By 1420, gambling by means of C. had grown to such a pitch as to provoke St. Bernardin to preach against it at Bologna; and that so eloquently as to cause his hearers to make a fire in the public place and throw all the C. in their possession into it—a proceeding which must have been hailed with joy by the Messrs. De la Rue of that period. The signs upon Italian C., which seem to have been the first imported into England, were cups, swords, money, and clubs; but in the third year of Edward IV., their further importation was forbidden, and the home-trade of card-making protected. C. were played by that time, we read, "in all places of worship" in this country, by which it was meant, not in the churches, but in the houses of all the gentry. Henry VII. was a card-player; and there are not a few entries in that mean monarch's privy-purse account of his majesty's little losings. His daughter Margaret, at the age of 14, was found by James IV. of Scotland—the first time he ever saw her—in the act of playing cards; and it was most probably *écarté*, for he at once "proposed" to her, and she "accepted" him. There was a sum regularly allotted to the princess, afterwards queen, Mary, as pocket-money for this especial purpose; the sums given her at a time for immediate disbursement ranging from 20s. to 40s., but one entry being so disgracefully low (for a princess) as "two and tuppence." James I. likewise played a good deal, but so sleepily that he required somebody to hold his C. for him.

About the year 1660, heraldic C. were first introduced into England, the king of clubs being represented by the arms of the pope; of spades, by those of the king of France; of diamonds, by those of the king of Spain; and of hearts, by those of the king of England. From these heraldic C., we suppose, Mr. Chatto derives the word coat-card, instead of court-card, which is certainly in more general use. In 1679, a pack was published containing the history of all the popish plots, "excellently engraved on copper-plates, with very large descriptions under each card. Aspersers of this pack," it is added by their disinterested publisher, "plainly show themselves to be popishly affected."

The French, from whom we derive our ordinary suits of diamond, heart, spade, and club—*carreau*, *cœur*, *pique*, and *trèfle*—were continually changing their court-cards, and representing on them all sorts of historical characters. In the earlier periods, their kings were David, Alexander, Cæsar, and Charlemagne, or Solomon, Augustus, Clovis, and Constantine; about all of whom, as well as their queens, Père Daniel has the most ingenious theories. Troope, says he, however brave and numerous, require to have prudent and experienced generals. The *trèfle* or clover-plant, which abounds in the meadows of France, denotes that a chief ought always to encamp his army in a place where he may obtain forage for his cavalry; *piques* and *carreaux* signify magazines of arms, which ought ever to be well stored—the *carreau* being a sort of heavy arrow shot from a cross-bow, and which was so called from its head being squared (*carré*); *cœur*, hearts, signified courage of both commanders and soldiers; the *ace* was the Latin *as*, and represented money, the sinews of war; and so on.

At the time of the French revolution, the places of the card-kings were filled by four philosophers—Molière, Lafontaine, Voltaire, and Rousseau; and those of the queens by four virtues—prudence, justice, temperance, and fortitude.

Many attempts have been made to put down card-playing by the strong hand of the law; but the history of the four kings has, nevertheless, always retained its students. Not a few enthusiastic players have absolutely died in harness, with cards in their hands, such as the great Bath player Lookup, who expired at his favorite "double dummy," not even being permitted by inexorable death to play out the game. The four kings, like their flesh-and-blood originals, were likely to lose all sway over the new world; for Mr. Chatto informs us, that the court-cards, if they could be called so, of a republican



pack manufactured in 1848 at New York, had neither kings nor queens; the president of hearts being Washington; of diamonds, John Adams; of clubs, Franklin; and of spades, Lafayette. One of the queens was Venus, modestly concealing her charms; and the others were respectively Fortune, Ceres, and Minerva; while the knaves were fitly represented by Indian chiefs.

The manufacture of playing-cards comprises many interesting processes. The cardboard employed for this purpose is formed of several thicknesses of paper pasted together; there are usually four such thicknesses; and the paper is so selected as to take paste, paint, and polish equally well. The sheets of paper are pasted with a brush, and are united by successive processes of cold-drying, hot-drying, and hydraulic pressure. Each sheet is large enough for 40 cards. The outer surfaces of the outer sheets are prepared with a kind of flinty coating, which gives sharpness to the outline of the various colored devices. Most packs of cards are now made with colored backs. The ground-tint is laid on with a brush, and consists of distemper color, or pigments mixed with warm melted size. The device impressed on this ground-tint is often very beautiful. Messrs. De la Rue, the leading firm in the manufacture, employ tasteful artists, and invest a large amount of capital, in the introduction of new patterns. On cards sold at moderate prices, the colors at the back are generally two—one for the ground, and one for the device; but some of the choicer specimens display several colors; and many of the designs are due to the pencil of Mr. Owen Jones. The printing of the design is done on the sheets of paper, before the pasting to form cardboard. The pips or spots on the faces of playing-cards are now *spades, clubs, hearts, and diamonds*; but at different times, and in different countries, there have been leaves, acorns, bells, cups, swords, fruit, heads, parasols, and other objects similarly represented. In English cards, the colors are red and black; Messrs. De la Rue once introduced red, black, green, and blue for the four suits; but the novelty was not encouraged by card-players. The same makers have also endeavored to supersede the clumsy devices of kings, queens, and knaves, by something more artistic; but this, too, failed commercially; for the old patterns, like the old willow-pattern dinner-plates, are still preferred—simply because the users have become accustomed to them. Until within the last few years, the printing of cards was generally done by *stenciling*, the color being applied through perforated devices in a stencil-plate. The color employed for this purpose is mixed up with a kind of paste. When there is a device at the back, the outline of the device is printed from an engraved wood-block, and the rest filled in by stenciling. The stenciling of the front and back can be done either before or after the pasting of the sheets into cardboard. One great improvement in the manufacture, has been the substitution of oil color for paste or size color; and another, the substitution of printing for stenciling. Messrs. De la Rue have expended large sums of money on these novelties; for many experiments had to be made, to determine how best to employ oil color so that the spots or pips may be equal-tinted, the outline clear and sharp, the pigment well adherent to the surface, and the drying such as to admit of polishing without stickiness. The plates for printing are engraved on copper or brass, or are produced by electrotypes, or are built up with small pieces of metal or interlaced wire. The printing is done in the usual way of color-printing, with as many plates as there are colors (usually five), and one for the outlines; it is executed on the sheets of paper, before being pasted into cardboard. When the printing, drying, and pasting are all completed, a careful polishing is effected by means of brush-wheels, pasteboard wheels, heated plates, and heated rollers, in such a way that the polish on the back may differ from that on the face—since it is found that two equally polished surfaces do not slide quite so readily over each other. Every pack of cards made in England for home-use pays a duty of threepence, which duty is levied on the ace of spades.

A few years ago, it was estimated that about half a million packs of cards are made annually in England, by about seven or eight firms. Card-playing is not now so general in England as it was early in the century, and the number made has consequently lessened, although the quality has greatly improved. All the cards used in Russia, with a few exceptions, are made at an imperial manufactory in St. Petersburg, where the operations are conducted on a large scale, and where the number of packs made exceeds manifold the whole produce of England. The French cards are somewhat smaller and thinner than those of England. The number of packs annually manufactured in the United States exceeds 14,000,000. In Corea, card-playing is frowned upon by the government, and is a pastime restricted to the lower classes, who indulge in it secretly.

See Chatto, *Facts and Speculations on the Origin and History of Playing Cards* (1848); E. S. Taylor, *History of Playing Cards* (1865); Willshire, *Descriptive Catalogues of Cards in the British Museum* (1877); Singer, *History of Playing Cards*; La Crolx, *Les Cartes à Jouer*; Van Rensselaer, *The Devil's Picture-Books, a History of Playing Cards* (N. Y., 1890.)

CARDUCCI, BARTOLOMEO, 1560-1608; an Italian artist; b. in Florence; studied under Zuccherò, whom he accompanied to Madrid, where he painted the ceiling of the Escorial library. He died in Spain, where most of his works are to be found, the most celebrated being a "Descent from the Cross," in a church in Madrid. His brother, Vincenzo, (1568-1638), was also a painter of celebrity, and the author of a dialogue on the excellencies of painting.

**CARDUCCI**, GIOSUÈ, b. Tuscany, 1836; philologist, became professor of Italian literature at the University of Bologna in 1861; was a founder of the poetical review *Il Poliziano* in 1868; published several notable poems, and edited collections of Italian classical poetry and of mediæval popular songs.

**CARDUELLIS**. See **GOLDFINCH**.

**CARDUUS**. See **THISTLE**.

**CARDWELL**, a co. in central Ontario, Canada, drained by several rivers, and having railroads, quarries of fine building stone, and massive ridges of limestone. Pop. '91, 15,392.

**CARDWELL**, EDWARD, 1787-1861; an English clergyman and ecclesiastical historian, educated at Oxford. In 1826, he was chosen Camden professor of ancient history, and during his period of office he wrote a translation of the *Ethics* of Aristotle, with notes, and *The Coinage of the Ancient Greeks and Romans*. In 1831, he was made principal of St. Alban's hall, and held the place through life. Among his publications were a student's edition of the Greek Testament; Josephus's history with notes; *Documentary Annals of the Reformed Church of England from 1546 to 1716*; *History of Conferences, etc., connected with the Revision of the Book of Common Prayer*; *Synodalia, a Collection of Religious Canons, and Proceedings of Convocation from 1547 to 1717*; and *Reformatio Legum Ecclesiasticarum*.

**CARDWELL**, EDWARD, Viscount, b. 1813; nephew of the Rev. Edward; graduated at Balliol college, and admitted to the bar, but preferred political life and entered parliament in 1842, being several times thereafter re-chosen. In 1845, he was secretary of the treasury and president of the board of trade. He was subsequently chief secretary for Ireland, chancellor of the duchy of Lancaster, and secretary of state for the colonies. In Gladstone's cabinet, 1868, he became secretary for war and a member of the committee of the council on education. In the war office he proposed and effected a reorganization of the army. With earl Stanhope he was one of the literary executors of sir Robert Peel, and one of the editors of Peel's *Memoirs*. He d. 1886.

**CARE** or **CARLE SUNDAY**, the Sunday before Palm Sunday, said to be so called because it was the practice in many parts of the country to eat gray peas, called carlings, fried in butter, pepper, and salt, on this day. This practice apparently had its more immediate origin in the custom of the Roman Catholic Church of eating hallowed beans fried at this time—these beans being described in some religious books as symbolical of confession, and their steeping before use, of meditation. It appears, however, to have been adopted by this church from a heathen custom. See Brand's *Popular Antiquities*.

**CAREENING** is the operation of heaving down a ship on one side, in order to expose the other side for cleaning by the process of *breaming* (q.v.). C. is seldom now performed upon English ships, partly because the use of copper-sheathing lessens the fouling of the bottom, and partly because caissons and hydraulic lifts afford means for raising ships out of the water. The *Great Eastern*, in 1860, was placed upon an open scaffolding or frame, called a *gridiron*, in Milford Haven, and floated so as to render cleansing possible without the dangerous and difficult process of careening.

In sea-phrase, a vessel is said to "careen" when she leans over very much through press of sail.

**CARET** (from the Latin *careo*, I am wanting), a character of this form, ^, denoting that something has been omitted, and is interlined.

**CARETTE** is the name given to a form of street-car that has recently been introduced experimentally in some of the Western cities. It is smaller than the ordinary horse-car, is lightly built, and requires no track. Two horses draw it, and it seats comfortably some twenty persons.

**CAREW**, GEORGE, 1557-1629; Earl of Totness and Baron of Clopton; educated at Oxford and joined the army, holding an important command in the Irish wars against the earl of Desmond. He filled several offices, among them that of one of the lord judges of Ireland, in which by a vigorous but prudent policy he speedily reduced the rebels to submission. His crowning exploit was the capture of Dunboy castle, an event that greatly disappointed the Spanish allies of the Irish, and ended the war. For these services he was raised to the peerage and made governor of Guernsey. His last office was that of privy councillor to James I. He wrote *Hibernia Pacata*, a history of the wars in Ireland.

**CAREW**, RICHARD, 1556-1620; an Oxford student who at the age of 14 was chosen to dispute extemporaneously with sir Philip Sidney in the presence of an audience of noblemen. He was sheriff of Cornwall, and the author of a *Survey* of that county, a work that enjoyed a high reputation. He also wrote, or translated from the Italian, *The Examination of Men's Wits*; *The True and Ready Way to Learn the Latin Tongue*; and made a translation of the first five cantos of Tasso's *Jerusalem Delivered*.

**CAREW**, THOMAS, a poet of the reign of Charles I., descended from an old family in Gloucestershire, was b. 1589. Having been educated at Oxford, he traveled abroad for some time, and on his return was received at court, and patronized by Charles I. C. deserves mention chiefly as the precursor and representative of what may be called the

courtier and conventional school of poetry, whose chief characteristic was scholarly ease and elegance, with a spice of indelicacy, and even indecency. C.'s poems, mostly lyrical, and treating of trifling subjects, are among the best of their kind, and exhibit much fancy and tenderness. He died 1639. Several editions of his poems, which first appeared in 1640, have been published.

**CAREX**, a genus of plants of the natural order *cyperaceae*, of which the species are very numerous—more than 450—principally abounding in the temperate and colder parts of the world. More than 60 are natives of Britain. The English name *SEDGE* or *SEG* is sometimes employed as synonymous with C., but is popularly applied only to some of the species. This genus is distinguished by unisexual flowers, the male flowers with one glume, the female inclosed in a flask-shaped involucre. Some of the species are plants of the very humblest growth, others are 2 or 3 ft. in height; all are of unpretending, grassy, or rush-like appearance. Some grow in wet, and others in dry situations; some are of great value in the economy of nature, as forming the principal part of the vegetation of swamps, which they gradually convert into fertile ground. The running roots, or rather *rhizomes*, are some help to bind the sands of sea-shores.

**CAREY, HENRY**, English composer, b. in London in 1683; d. there, Oct. 4, 1743. He was a reputed son of George Saville, Marquis of Halifax. After studying music under Claus Westcinson Linnert, Roseingrave, and Geminiani, he taught for his living, and wrote a number of musical dramas and ballad operas. He was the author of the libretto of *The Dragon of Wantley*, music by Lampe, London, Oct. 26, 1737; and also published six cantatas (1732), and *The Musical Century in One Hundred English Ballads* (1739-40; 8d ed., 1743). His name will be remembered for his ballad, *Sally in Our Alley*. The author's account of it is as follows: "A shoemaker's prentice, making holiday with his sweetheart, treated her with a sight of Bedlam, the puppet-shows, the flying chairs, and all the elegancies of Moorfields, from whence, proceeding to the Farthing Rye House, he gave her a collation of buns, cheese-cakes, gammon of bacon, stuffed beef and bottled ale, through all of which scenes the author dodged them. Charmed with the simplicity of their courtship, he drew from what he had witnessed this little sketch of nature." His son, **GEORGE SAVILLE CAREY** (1743-1807), poet and dramatist, endeavored to establish his father's claim to the composition of *God Save the King*, which question is still undecided. Carey's granddaughter, Anne, was the mother of Edmund Kean, the tragedian.

**CAREY, HENRY CHARLES**, an American political economist, b. at Philadelphia in 1793. In 1836 he published an essay on the *Rate of Wages*, which was expanded into the *Principles of Political Economy* (1837-40). The value of this work may be estimated from the fact, that no less an authority than Frederic Bastiat copied its leading ideas. It was translated into Italian and Swedish, and favorably noticed in all the important politico-economic journals of Europe. In 1838, C. published *The Credit System of France, Great Britain, and the United States*; and in 1848, *The Past, the Present, and the Future*, a work marked by great vigor and originality. In 1853, appeared the *Letters on the International Copyright*; in 1858, *Principles of Social Science*; in 1867, *Reviews of the Decade 1857-67*; and, in 1878, *The Unity of Law*. C. was originally a free trader, but was ere long recognized as the head of a new school of political economy. According to this system, free-trade may be the ideal towards which we should tend, but a period of protection is an indispensable stage in the progress towards it. He d. 1879.

**CAREY, MATHEW**, b. Ireland, 1760, d. Philadelphia, 1839; an author and publisher. In consequence of publishing an address to the Irish Roman Catholics on their oppression by the penal code (about 1778) he was compelled to leave Ireland, but returned within a year and established, in 1788, the *Volunteer's Journal*. His attacks upon parliament and the ministry caused his imprisonment in Newgate until the dissolution of parliament. He arrived in Philadelphia by the aid of Lafayette, who sent him \$400, and immediately started *The Pennsylvania Herald*, one of the first papers in the country to furnish accurate reports of legislative debates. In Jan., 1786, he fought a duel with col. Oswald, another editor, and was seriously wounded. He was subsequently connected with the *Columbian Magazine* and the *American Museum*. In 1791, he began trade as a bookseller, and with his sons built up a prosperous business. During the epidemic of yellow fever in 1793 he was active in the work of relief, and afterwards wrote a history of the disease. In 1798, he, with others, founded the Hibernian society, and in 1796 he assisted bishop White in establishing the first Sunday-school society. Carey was a constant writer, and published a great number of essays on party politics, political economy, and social questions. Among his favorite ideas were internal improvements and a protective tariff. His son Henry C. (q. v.) was one of the foremost American writers on political economy.

**CAREY, WILLIAM, D.D.**, a distinguished minister and missionary belonging to the Baptist body, was b. at Paulersbury, a village in Northamptonshire, Aug., 1761. He served his time as a shoemaker, but began to preach about his 20th year. A pamphlet which he published about this time, attracted the attention of his co-workers in the ministry to the subject of foreign missions, and ultimately a missionary society, chiefly through C.'s exertions, was formed. C. and a Mr. Thomas were chosen its first missionaries to India in 1793. From that time until his death in 1834, C. was indefatigable

(under many difficulties, especially in his early years) in his efforts to spread the knowledge of the Gospel among the heathen. Under his direction, the Serampore mission, of which he was the principal founder, had up to 1832 issued above 200,000 Bibles, or portions thereof, in about forty oriental languages or dialects, besides a great number of tracts and other religious works in various languages. A great proportion of the actual literary labor involved in these undertakings was performed by C. himself, whose Sanskrit and other grammars have been very highly spoken of by the late Mr. Wilson Boden, professor of Sanskrit at Oxford. C. was professor of oriental languages at Fort-William college, Calcutta, from 1800 to 1830.

**CARGILL, DONALD**, abt. 1619-81; a leader of the covenanters, appointed to a church in Glasgow, where he made himself so obnoxious to the government that he was forced to leave. He was wounded in the battle of Bothwell, and fled to Holland; but returned almost immediately and joined Richard Cameron in publishing the Sanguhar declaration, and boldly excommunicated the king and his officials. He was soon afterwards arrested and beheaded at Edinburgh.

**CARGO** is a general name for all the merchandise carried on board a trading-ship. Sometimes it is applied also to the invoice of the cargo. The term *deck-cargo*, is given to the commodities on deck, which are not usually included in the policy of insurance.

For the security of the customs' revenue, the master of every coasting-vessel is bound to keep a *cargo-book*, recording the name of the vessel, the name of the owner, the port of departure, the port of destination, the goods taken, the name of the shippers and consignees, the time of departure and other particulars. The custom-house officers may demand to see this book at any time. The C. of passenger ships is placed, in some degree, under the control of the emigration officers by an act passed in 1852.

**CARHEIL, ETIENNE DE**, a Jesuit missionary among the Indians of Canada about 1668. He was among the earliest to master the native languages. The time of his death is not known, but he was at missionary work as late as 1731.

**CARIA**, in ancient geography, the south-westernmost country of Asia Minor, bounded n. by Lydia, e. by Phrygia, s.e. by Lycia, and w. and s.w. by the Mediterranean. A large portion of what was C. is mountainous. The chief ranges were called the Cadmian and the Latmian. The most important river was the *Maander*, famous for its windings. C. was, at an early date, governed by petty princes or kings; it afterwards became a part of the Persian empire, the former princes continuing to rule as satraps; and it subsequently came into the hands of the early Macedonian kings of Egypt; and finally, with the rest of Asia, into those of the Romans. Among the chief towns were Cnidus, Halicarnassus, and Miletus.

**CARIA'CO**, a seaport of Venezuela, at the mouth of a river, and at the head of a gulf of the same name. It is 40 m. to the e. of Cumana, in lat. 10° 30' n., and long. 68° 40' west. Pop. 7,000. The gulf, long and narrow, with good anchorage, and well-wooded shores, is open only on the w., and that to a portion of the Caribbean sea, which is itself breasted by a chain of islands.

**CAR'JIACOU, CARJACOU, or VIRGINIAN DEER**, *Cervus Virginianus*, a species of deer found in all parts of North America, from Mexico to about n. lat. 43°, and from the Atlantic to the Pacific ocean. It is the species commonly called deer by the Anglo-Americans. It is smaller and more elegant than the common stag; of very variable color—light reddish brown in spring, slaty blue in autumn, and dull brown in winter; the belly, throat, chin, and inner parts of the limbs white. The horns of the adult male are of moderate size, bent strongly backward, and then suddenly forward, so as to bring their tips nearly above the nose; they have several snags. The fawn is profusely decked with white spots, arranged in lines, and sometimes running into stripes. The name C. is extended generically to several nearly allied species, found in Mexico, California, etc.

**CARIA'MA**, *Microdactylus cristatus*, a bird of the order *gralla*, allied to the cranes, but exhibiting also points of strong resemblance to gallinaceous birds, among which it has therefore been proposed to rank it, next to the guans. It is a native of Guiana, Brazil, and Paraguay, inhabiting open plains and the outskirts of forests, where it feeds chiefly on serpents, lizards, and insects. It is larger than the common heron; the plumage is brown, finely waved with darker brown, whitish on the lower parts. When pursued, the C. seeks safety by running, and does not readily attempt to use its wings. Its voice resembles that of a young turkey. It is much esteemed for the table, and it is sometimes reared in a domesticated state. See *illus.*, OSTRICH, etc., vol. XI.

**CARIBBEAN SEA**, the grandest inlet of the western hemisphere—corresponding, in several respects, to the Mediterranean in the eastern—is separated from the gulf of Mexico by Yucatan, and from the Atlantic ocean by the great arch of the Antilles, between Cuba and Trinidad inclusive, stretching in n. lat. from about 8° to about 22°, and in w. long. from about 61° to about 89°. The C. S. forms the turning-point in the vast cycle of waters known as the Gulf stream (q.v.), that wheels round, with the regularity of time itself, from southern Africa to northern Europe. Its pours its waters into the Gulf of Mexico on the w., which shoots forth, on the e., the Florida stream with the computed volume of 8,000 Mississippi. To supply this enormous efflux, the C. S. draws on the Atlantic, laying under contribution nearly all the trade-wind regions of that ocean,

so as literally to become the receptacle of the Amazon and the Orinoco. To the British Isles, it is, in this connection, an object of peculiar interest. Rendering still warmer the warm floods which it concentrates, it imparts to the Florida stream that high temperature which tends, with the aid of the prevalent winds, to mitigate climate from Guernsey to Shetland. In common with the islands of its eastern boundary, the C. S. takes its name from their now extinct aborigines, the Caribs.

**CARIBBEE BARK**, or **PITON BARK**, is the bark of *exostemma Caribæum*, a small tree which grows in the West Indies and in Mexico, and belongs to the natural order *cinchonaceæ*. The genus *exostemma* is very nearly allied to *cinchona* (q.v.).

**CARIBBEE ISLANDS**. See **ANTILLES**.

**CARIBOU**. See **REINDEER**.

**CARIBS**, Indians of the West India islands, who were in the time of Columbus numerous and powerful; a warlike and aggressive people, who pertinaciously opposed the advances of the Europeans. It is supposed, though not proved, that they were addicted to cannibalism. They have almost entirely disappeared from the islands; and at present their chief settlement is in Honduras, where they form an industrious and prosperous portion of the people, though still retaining their language and many of their customs. In 1796, the English, weary of the continual disturbances occasioned by the Caribs, transported them in a body from Dominica and St. Vincent to the island of Ruatan. There are two great tribes, the red, and the black.

**CARICA**. See **PAPAW**.

**CARICATURE** (Ital. *caricatura* from *caricare*, to load), a term sometimes used to denote a kind of satirical literature, but more often to define a pictorial or sculptured representation of some person, object or incident in which, as a rule, the features or lines are exaggerated so as to produce a ludicrous effect without destroying the likeness to the original. This degenerate form of art, which is common to all nations and periods of history, is found on monuments, walls, gems, pottery, and Egyptian papyrus; exhibits itself in the grotesque carvings on mediæval cathedrals, or in the minute objects carved from ivory by a Japanese artisan of to-day. The word caricature is a modern one, occurring as *caricatura* in Sir Thomas Browne's posthumous work, *Christian Morals* (1716), but not appearing in its present form till about 1788, when Francis Grose published *Rules for Drawing Caricatures*. It is in popular usage applied almost entirely to work done with brush or pencil.

The etchings of Hans Holbein, the younger, of the "Dance of Death" were powerful satires on the life of his period, and the "Passionale of Christ and Antichrist" of Lucas Cranach not only aided the cause of the Reformation, but gave an impetus to caricature which has been employed by an increasing number of painters and etchers down to the present time, serving as an important factor in correcting social or political abuses, and often accomplishing with a few pencil strokes what debates and editorials had failed to bring about, or exerting a most pernicious influence when not allied with morality. It was reserved for the nineteenth century, in England, at least, to free caricature from brutal coarseness without depriving it of effectiveness. In political caricature England furnishes the pre-eminent names of Rowlandson, Gillray, John Doyle ("H. B."), and Tenniel; in caricatures of social life, those of Hogarth, George Cruikshank, Leech, Richard Doyle, Du Maurier (b. Paris), and Sambourne. France has produced, among many, Monnier, Charlet, Daumier, Gavarni, Grandville, de Noé ("Cham"), and Grévin; Spain has her unrivalled Francisco Goya; the United States, Nast, Keppler (both of German birth), and Frost. The principal modern journals devoted to caricature are the German *Fliegende Blätter* and *Kladderadatsch*; the French *La Vie Parisienne*, *Le Petit Journal pour Rire*, and *Le Journal Amusant*; the English *Punch* and *Vanity Fair*, and the American *Puck* and *Life*. See works (in French) on caricature by Champfleury; Parton, *Caricature and other Comic Arts* (1877); Everitt, *English Caricaturists of the 19th Century* (1886); Grand Carteret, *Les Mœurs et la Caricature en France* (1888).

**CARIES** (*rottenness*) is a disease of bone analogous to the ulceration of soft tissues. It is characterized by a gradual loss of substance, from the particles of bone being absorbed, or being cast off and washed away in a purulent discharge. It begins as an unhealthy inflammation, followed by exudation of new materials, and softening of the part affected. On examination, the bone-cells are found filled with a reddish glairy fluid, and in scrofulous patients, deposits of tubercle. After C. has existed for some time, an abscess forms, and bursts; its aperture remains open, discharging a thin fluid, which contains particles of the bone. If a probe be passed through this opening, it will be felt to sink into some soft gritty substance; this is the carious bone, which, if removed, and well washed, will be found to resemble in whiteness and fragility loaf-sugar softening in hot water.

C. may attack any bone, but it usually selects the vertebræ, those of the wrist and foot, and the soft ends of long bones forming joints. To this terrible disease most deformities, not congenital, are owing. The carious vertebræ yield under the weight of the trunk, and the spine curves forwards, or to one side. In the joint-ends of bones, the part enlarges, the cartilages become affected, matter forms, and amputation of the limb, or excision of the joint, is frequently necessary to save the patient's life. Too often the disease recurs with night-sweats, hectic, and death.

The causes of C. are constitutional, though it may be accidentally determined to some

particular part of the body by any irritation, such as a blow, or exposure to atmospheric changes. Scrofulous persons, and those who have had syphilis or mercury in excess at any period of their lives, are more subject to it than others. If affecting a small bone, the latter may be entirely removed; and if the disease is strictly limited to the ends of bones forming a joint, these may be excised. Within the last 30 years, great advances have been made in this department of surgery, and C. of the joints is but seldom counted a sufficient reason for amputation; the knee, hip, shoulder, elbow, ankle, and wrist joints have all been repeatedly excised successfully in this country. In situations where the part cannot be reached by instruments, lotions of dilute acid may be injected, with the view of stimulating the carious surface to assume a healing action.

The treatment of C. consists in supporting the patient's strength by judicious change of air, and tonics, with the administration of medicines, such as cod-liver oil in scrofula, which appear to combat the constitutional predisposition to the disease. In those parts where the diseased bone can be reached, it should be gouged or scraped away, so as to leave a healthy surface of bone, which may granulate up, and heal.

**CARIES OF THE TEETH** depends, it is supposed, on an original faulty formation of their substance, when, after any depressing cause, especially in scrofulous and ill-nourished persons, they soften and crumble away, at last laying open the cavity which contains the nervous pulp of the tooth, and producing toothache. *Treatment*.—The carious surface should be removed, and, as a substitute for the lost substance, gold or some other substance should be stuffed into the cavity. If the pulp be exposed, the hole should be stuffed with some softer material, till the parts are somewhat hardened; for this, some authorities recommend a plug of cotton-wool dipped in a mixture of mastich, a dram, and rectified spirit or eau-de-Cologne, 1½ oz.; or of gutta-percha dissolved in chloroform.

**CARIGNANO**, a t. of Piedmont, in the province of Turin, about 11 m. s. of the city of that name. It is situated near the left bank of the Po, in the midst of a most beautiful country; has some fine churches, and manufactures of silk-twist. This town gives name to a branch of the house of Savoy. Pop. about 7000.

**CARTILON**. See **BELL**.

**CARIMATA**, a name applied to the passage between Borneo and Billiton; also to a cluster of islets in the same passage; and, lastly, to the principal member of the group, whose highest point, a peak of 2,000 ft., is in lat. 1° 36' s., and long. 108° 54' e.

**CARINARIA**, a remarkable and interesting genus of gasteropodous mollusks, of the order called *heteropoda* or *nucleobranchiata*, having a thin shell, in form somewhat like that of a limpet, which, however, only covers the visceral sac (heart, gills, etc.), leaving the greater part of the animal exposed. The shells of some of the species have been sometimes denominated *Venus's slipper* and *glass nautilus*. The body is gelatinous, and so transparent that much of its interior organization can be seen. Nearly opposite to the part of the back occupied by the shell is a sort of vertical fin, answering to the foot of the other gasteropods. The species of C. are all marine, are found only in the seas of the warmer latitudes, and generally swim with the back downward. Closely allied to C. is the genus *pterotrachea*, in which there is no shell at all. See **ILLUS.**, **TERTIARY PERIOD**, vol. XIV.

**CARINI**, a t. of Sicily, in the province of Palermo, and 12 m. w.n.w. of the city of that name. It has an old castle, and a pop. of about 10,000, chiefly engaged in fishing.

**CARINOLA**, a t. of s. Italy, in the province of Caserta, 20 m. s.e. of Gaeta.

**CARINTHIA** (Ger. *Kärnten*), a crown-land of the Austrian empire, forming part of the old kingdom of Illyria, with an area of 3958 sq. m., and a pop. in 1890, of 381,008, which is little more than what it was in 1880. The principal river is the Drave, which passes through the country from w. to e., in a course of almost 150 miles. The general aspect of the country is mountainous, with long deep valleys, that of the Drave widening at Villach and Klagenfurt into a great plain. The valley of the Drave divides the *Noric* from the *Carinthian Alps*. Agriculture is carried on to a limited extent, owing to the mountainous character of the country, great part of which is occupied in pasture, or covered with brushwood. Many horses and cattle are reared and exported. Lead and iron ores are extensively mined. One of the principal branches of industry is the manufacture of hardware; the other manufactures include woollens, silk stuffs, and cottons. The capital is Klagenfurt.—The ancient inhabitants were the *Carni*, who derived their name from the Celtic word *earn* or *corn*, Lat. *cornu*, Eng. *horn*—an allusion to the craggy, horn-like pinnacles of their hills. Before the time of Augustus, it belonged to Noricum, afterwards to the Roman empire. By and by the Carni were swept away in the deluge of immigration from the e., and Slaves settled in the country. After some time the Slaves themselves were so heavily oppressed by the Avari, that they called to their assistance a Frank, named Samo, who founded the kingdom of Carantania, which included much more than the present C., but fell to pieces after his death. Finally, it came into the possession of Austria (q.v.). Only about two sevenths of the present population is Slavic (Slovenians), the remainder being Germans.

**CARINUS**, **MARCUS AURELIUS**, son of Carus, succeeded his father as emperor of Rome in 283 A.D. He was a cruel and profligate ruler, and the soldiers naturally

rebelled, proclaiming Diocletian. Carinus marched into Mœsia to quell the revolt, and won a decisive victory, but at the moment of triumph he was killed by one of his soldiers whose wife the profligate emperor had led away.

**CARIPÉ**, a t. of Venezuela, South America, situated in a fertile valley of the same name, 50 m. s.e. of Cumana. The valley is noted for a cavern frequented by the remarkable bird called guacharo (q. v.). Pop. of town and valley, 5000.

**CARISBROOKE**, a village in the isle of Wight almost adjoining Newport, chiefly noted for its castle, which is supposed to have been built by the Saxons in the 6th century. It was enlarged in the 11th c. by the first lord of Wight; was captured by Stephen in 1136, and in the time of Richard II. successfully resisted attacks by the French. During Elizabeth's reign it was further enlarged until its outer walls inclosed 20 acres. It was in this castle that Charles I. took refuge in Nov., 1647, but he soon found his asylum a prison. After his execution his two youngest children were confined in the castle, and the princess Elizabeth died there. The remains of the castle are still extensive. Opposite the castle-hill are the remains of a Cistercian priory founded in the 11th c., and the parish church claims even a greater antiquity.

**CARISSA**, a genus of plants of the natural order *apocynaceæ*. *C. carandas* is a thorny shrub, much used for fences in India; and the fruit, called carandas—a berry about the size of a small plum—for tarts and preserves.

**CARISIMMI**, GIOVANNI GIACOMO, b. about 1604 near Rome; became chapel-master, or director of music, at the age of 20. By education he belonged to the old Roman school of music, but his compositions mark the turning-point from the traditions of the renaissance period to the incipient aspirations of modern music. His numerous compositions include masses, cantatas, motets, and oratorios.

**CARLEE**, or KARLI, a village in India, 40 m. e. of Bombay, remarkable only for a Buddhist temple hewn into a rocky precipice which rises 800 ft. above the plain, the temple being about two thirds of the way up. The temple is 180 by 40 ft., with a high arched roof. An arch rises over the entrance to the artificial cavern, and before each of the side entrances are screens of stone-work ornamented with naked male and female figures in *alto-relievo*. In front are three large lions, and around the portico are figures of elephants, each one surmounted by a driver and a howdah or saddle containing figures of two persons. The interior is finished with a double row of sculptured pillars forming a semicircle. This curious temple is well preserved.

**CARLEN**, EMILIE, a well-known Swedish novel-writer, was b. 8th Aug., 1807, at Strömstad, near the frontier of Norway. She was the youngest of 14 children of a merchant named Smith. During childhood her talent in imaginative fiction was remarked by her friends; but it was not till 1838 that her first novel, *Waldemar Klein*, was given to the world. She was then a widow, having been married, in 1827, to Dr. Flygare. In 1841, she was again married to J. G. Carlen, a lawyer, and known as a poet, in Stockholm. Her literary productiveness has been very remarkable, her fictions being chiefly founded on the characteristics of the lower orders in Sweden; and, although faulty in many respects, they are especially rich and striking in incident; and her characters, without exhibiting any very deep insight or subtle analytic power, are yet intelligent and consistent. Among her many works, which have been translated into English, are *The Rose of Thistledale*; *The Birthright*; *The Hermit*; *The Events of a Year*; *The Lover's Stratagem*; *Gustavus Lindurm*; *The Maiden's Tower*; *Woman's Life*, etc. Her works are largely circulated both in Europe and in America. She died in 1863.

**CARLETON**, a co. in New Brunswick, Can., on the Maine border, drained by the St. John and its tributaries; 8008 sq. m.; pop. '91, 22,529. The surface is rough, with forests and excellent timber. Chief town, Woodstock.

**CARLETON**, a co. in e. Ontario, Can., on the Ottawa river; 647 sq. m.; pop. '91, 21,746. The co. is traversed by the Ottawa and Prescott railroad, and the Rideau canal. Lumbering is the principal business of the people. Chief town, Ottawa.

**CARLETON**, Sir GUY, Lord Dorchester, 1724-1808; a British officer distinguished at Louisburg, Quebec, and Belle Isle, and wounded in the siege of Havana in 1763. He was a lieut. gen. in the British army, and the successor of sir Henry Clinton in chief command in the American colonies during the war of the revolution and till its close.

**CARLETON**, WILLIAM, one of the most popular writers of tales describing Irish life and manners, was b. 1794, at Prillisk, in the co. of Tyrone, Ireland. Bred and educated among the peasantry, he passed through the common sufferings and privations of Irish poverty, and, after receiving some scanty instruction in a hedge-school, he, in his 17th year, went to an academy which a relative had opened at Glasslough, where he remained two years. Afterwards, a vague ambition led him to Dublin, where he arrived with only some three shillings in his pocket, and where, in 1830, he published his *Traits and Stories of the Irish Peasantry*. Their freshness of style pleased the public, and won the favor of critics. A second series, issued in 1832, was also well received; and, in 1839, he published a powerful story, entitled *Fardorougha the Miser*, in several passages of which, however, his humor becomes extravagant. Subsequently, C. published a series of tales (8 vols., Dub. 1841), mostly of pathetic interest, but including a very genial

and humorous sketch of the *Misfortunes of Barney Branagan*, which proved a great favorite. The story of *Valentine McClutchy* is half-political and half-religious in its tendency, defending the Irish Catholic priesthood, and advocating repeal of the union; it appeared in 1845. Other narratives—*Rody the Rover*, 1846; *The Black Prophet*, 1847; and *The Tithe Proctor*, 1849—contain many proofs of the author's genius. *Willy Reilly*, 3 vols., appeared in 1855, and *The Evil Eye* in 1860. C. is the true historian of the Irish people. Sharing in their qualities of mind and temperament, he has a true sympathy with all their joys and sorrows, and a graphic pen to describe them. He d. in 1869.

**CARLETON**, WILL, American poet, born Hudson, Mich., in 1845; graduated at Hillsdale College in 1869; favorably known as a lecturer in the United States and Great Britain; author of *Poems* (Chicago, 1871); *Farm Ballads* (N. Y., 1878); *Farm Legends* (N. Y., 1875); *Young Folks' Centennial Rhymes* (1876); *Farm Festivals* (1881); *City Ballads* (1885); *City Festivals* (1892); *Rhymes of our Planet* (1895), etc. His poems, *Betsy and I are out*, *Over the Hills to the Poorhouse*, and *The Burning of Chicago*, were very popular.

**CARLETON PLACE**, a town in Lanark co., Ontario, Canada; 28 miles from Ottawa; on the Canadian Pacific railroad. It contains large saw-mills and railway and other workshops. Pop. 1891, 4435.

**CARLI**, GIOVANNI RINALDO, a distinguished Italian economist and archæologist, was b. at Capo d'Istria, April, 1720. Educated at home and at Flambro in the Friuli, he was, in his 24th year, appointed professor of astronomy and navigation at Padua. In 1754, he published the first volume of his great work *On the History of the Coins and Currency and on the Institution of the Mints of Italy*. He died Feb., 1795.

**CARLINE**, or **CAROLINE**, is a small silver coin used in some of the Italian states. It was named after Carlo VI. of Naples, and its intrinsic worth is about seven cents.

**CARLINE THISTLE**, *Carlina*, a genus of plants of the natural order *compositæ*, closely allied to the true thistles, from which they are distinguished by the inner scales of the involucre spreading like rays, and being colored and shining. These involucre scales are remarkably hygrometric, expanding in dry and closing together in wet weather, and this property they retain for a long time; the heads of flowers are therefore often nailed on cottage-doors in many parts of Europe, to indicate the weather. The name C. T. is derived from a legend, that an angel showed the root of one of the species to Charlemagne, as a remedy for a plague. This species, *C. acaulis*, grows on hills and mountains, especially in calcareous soils in the middle latitudes of Europe. It has a very short stem, and very large heads of flowers, and was formerly in high repute for the medicinal virtues of its root—which is in large doses a drastic purgative—but its use is now almost confined to veterinary practice.—The only British species is the common C. T. (*C. vulgaris*), not unfrequent in England and some parts of Scotland, and sometimes rather a troublesome weed, but always indicative of a poor soil. It has a stem about a foot high; and purplish heads of flowers set amidst straw-colored rays.

**CAR-LINGS**, in shipbuilding, are small beams laid fore and aft, and resting upon the main or deck beams. These, with other pieces called *ledges*, laid at right angles to them, form a framework by which the deck is supported.

**CARLINVILLE**, a city and co. seat of Macoupin co., Ill., on the Chicago and Alton railroad, 39 m. s.w. of Springfield. It is the seat of Blackburn university, is an important centre for local trade and has several coal mines. Pop. '90, 8298.

**CARLISLE**, a co. in western Kentucky, on the Mississippi river, formed 1886 from part of Ballard; about 190 sq. m.; pop. '90, 7612. It is drained by Mayfield Creek, and crossed by the Mobile and Ohio and Illinois Central railroads. Surface, nearly level; productions, corn, tobacco, and pork. Co. seat, Bardwell.

**CARLISLE**, a borough and co. seat of Cumberland co., Penn., on the Cumberland Valley and the Gettysburg and Harrisburg railroads; 18 m. w. of Harrisburg. It is in a highly productive agricultural region; is well built, with wide and handsome streets, and several fine public buildings. Dickinson College was founded here in 1783 by the Presbyterian denomination. It is also the seat of the U. S. Indian Training School, and of Metzger Female College. Carlisle Springs, in the mountains, is a popular summer resort. Washington had his head-quarters in C. during the Whiskey Rebellion in 1794, and in July, 1863, the place was bombarded by the confederates. Pop. '90, 7620.

**CARLISLE**, a parliamentary and municipal borough, episcopal city, and ancient town in North Cumberland, the capital of the co., 12 m. e. of the Solway firth, 300 m. n.w. by n. of London, 101 m. s. of Edinburgh, and 60 w.s.w. of Newcastle. It is a chief station on the w. railway route from London to Edinburgh, and is the terminus of seven different lines of railway. It stands on an eminence in a wide plain at the confluence of, and nearly surrounded by, the Eden, Caldew, and Peteril. Many fine new streets and buildings have been lately added to the city. The chief branches of industry are cotton, gingham, and check manufactures; print, iron, and dye works; and salmon fisheries. It has a small cathedral of red freestone, of which Paley was archdeacon. The castle was founded in 1092, and is now a barracks; the remains of the keep form a massive lofty tower, with a very deep well. Mary queen of Scots was confined in the castle after the battle of Langside. A canal of 11 m., from Bowness on the Solway



firth to C., formerly admitted vessels of 100 tons; but the bed of the canal has now been converted into a railway, from which a line also branches to the newly formed port of Silloth, where an extensive dock has been constructed on the Solway, at a distance of 20 m. from Carlisle. Pop. in 1763, 4,000; 1801, 10,221; 1851, 26,310; 1861, 29,417; 1891, 39,200. C. returns one member to parliament. Roman remains have been found here—coins, altars, inscriptions, brass incense vases, etc. Being near the w. end of Hadrian's wall, C. was probably a Roman station. It was the seat of the ancient kings of Cumbria. The Picts and Scots ravaged it. About 900, it was destroyed by the Danes, after which it remained desolate for 200 years. Thence to the union of England and Scotland, it was closely connected with the border wars, and underwent many sieges. To its being long a fortified border town it owed much of its importance and privileges, but it declined much after the union. During the civil war it declared for King Charles and suffered severely at the hands of the Parliamentarians. The C. corporation in 1745 proclaimed prince Charles king of Great Britain. The duke of Cumberland afterwards took the city, and punished the chief actors with death, and the inhabitants with other cruelties. In 1133, Henry I. made C. a bishopric.—The C. tables of mortality, based on the deaths which occurred in C. 1770-87, were drawn up by Dr. Heysham, and have been ever since much used by life-insurance offices.

CARLISLE CATHEDRAL was commenced about 1092 by Walter, a Norman. It was founded by William Rufus, and dedicated in 1101 by Henry I.; and in 1183, was made the cathedral church of the newly formed diocese. A great part of the original Norman building was destroyed by fire in 1292. The new edifice contains specimens of all the styles of early English—simple pointed, geometric, and flowing. Two thirds of the fine Norman nave, originally 141 ft. long, were destroyed by Cromwell; the portion that was left has long been used as a parish church. In 1853, the restoration was commenced. The choir is one of the finest in England, 188 ft. long, and 73 high, and consists of 8 pointed arches. The e. window, consisting of 9 lights, is considered the finest decorated window in England. The tower is very low, rising but one story above the choir. It formerly supported a timber spire, which was removed in 1661. This cathedral has four canons.

**CARLISLE, GEORGE WILLIAM FREDERICK HOWARD**, Earl of, K.G., was b. April 18, 1802. Educated at Eton and Oxford, he, in 1821, obtained the Chancellor and Newdegate prizes for his Latin and English poems. He entered the public service in 1826 as an attaché. In 1830, he (then lord Morpeth), along with Henry (afterwards lord) Brougham, was elected one of the representatives of the important constituency of Yorkshire, and after the reform bill for the West Riding, a position which he held in the liberal interest for several years. Under the administration of lord Melbourne, he held the office of chief secretary for Ireland (1835-41), and his impartial distribution of patronage made him very popular in Dublin. Rejected in 1841 by the West Riding, he was again elected in 1846, and remained one of its representatives until the death of his father (1848) called him to the house of lords. Under lord John Russell's ministry (1846-52), he was chief commissioner of woods and forests, and afterwards chancellor of the duchy of Lancaster. When lord Palmerston was made prime minister in 1855, C. was appointed lord lieutenant of Ireland, a post which he held until the advent of the earl of Derby's government in 1858; and he succeeded to the same office again when lord Palmerston was reinstated in 1859. C. obtained some reputation as a literary man, chiefly by his lectures on his travels in the United States, on the life and writings of Pope, and his *Diary in Turkish and Greek Waters*. He died in 1864.

**CARLISLE, JAMES H., LL.D.**; b. S. C., 1825; graduated at S. C. college, 1844; taught a classical school in Columbia until 1864; prof. mathematics in Wofford college, Spartansburg, 1854-75, when he was elected president. He has pub. addresses, edited *Ascham and Arnold*, in the "Chautauqua Garnet series," and is a counselor of the Chautauqua Literary and Scientific circle.

**CARLISLE, JOHN GRIFFIN**, b. Ky., 1835; received a common school education, and taught school. He was admitted to the bar, 1858; was elected to the lower house of the legislature, 1866, and to the state senate, 1866 and 1869; was lieut.-gov. of Ky., 1871-75; was presidential elector, 1876. He was elected to congress in 1877, and became prominent by his advocacy of revenue reform, and by his services on the committee of ways and means. C. was elected speaker of the house in 1888. He is regarded as one of the leading advocates of free trade, although he has declared that he favors only an approximation to the free trade standard. He was elected U. S. senator in 1890, resigned in 1893 to become secretary of the treasury, and resumed law practice in 1897.

**CARLISTS.** See CARLOS DE BOURBON and CARLOS, DON.

**CARLOS DON**, Infante of Spain, b. July 8, 1545, at Valladolid, was a son of Philip II. After his recognition as heir to the throne, in 1560, Don C. was sent to study at the university of Alcalá de Henares; where, however, he profited so little, that the king, regarding him as unqualified to reign, invited a nephew, the archduke Rudolf, to Spain, intending to make him heir to the throne. Excluded from all participation in the government, Don C. conceived a strong aversion toward the king's confidants, and especially was unwilling that the duke of Alba should have the government of Flanders.

In confession to a priest, on Christmas eve, 1567, he betrayed his purpose to assassinate a certain person; and as the king was believed to be the intended victim, this confession was divulged. The papers of Don C. were seized, and being tried, he was found guilty of conspiring against the life of the king, and of traitorously endeavoring to raise an insurrection in Flanders. The sentence was left for the king to pronounce. Philip declared that he could make no exception in favor of such an unworthy son; but sentence of death was not formally recorded. Shortly afterwards, he died, July 24, 1568, and was interred in the Dominican monastery, El-Real, at Madrid. The suspicion that he was poisoned or strangled, has no valid evidence to support it. Schiller, in his tragedy *Don Carlos*, has widely departed from historical testimonies.

**CARLOS, LUIS MARIA FERNANDO**, DON, 1818-61; son of Don Carlos Maria Isidor. In 1846, he lived in England with his father, under the name of Montemolin. In April, 1849, he went in disguise to Spain, was discovered and kept in prison for a few days, but returned to England before the end of the month. In 1860, he invaded Spain with 8,000 men, and was defeated and made prisoner at Tortosa. Being again set free, on condition of renouncing his claim to the throne, his first act was to repudiate that renunciation.

• **CARLOS, MARIA DE LOS DOLORES JUAN ISIDOR JOSEF FRANCISCO QUIRINO ANTONIO MIGUEL GABRIEL RAFAEL**, DON, b. Mar. 30, 1848; nephew of Luis Maria Fernando; present claimant of the throne of Spain as the legitimate heir of Charles VIII. As Charles VI. died without issue, his rights devolved upon his brother Don Juan, who had married the archduchess Maria Theresa of Austria, princess of Modena. Their son, the present Don Carlos, was educated principally in Austria, and married Margaret de Bourbon, princess of Parma, daughter of the late duke Ferdinand, Charles III., and sister of the late count de Chambord, who claims to be Henry V. of France. In Oct., 1868, Don Juan abdicated in favor of his son, whose standard was raised by some of his partisans in the n. of Spain in April, 1872. On the 16th of July following, Don Carlos published a proclamation calling upon the people of Catalonia, Aragon, and Valencia to take arms in his cause, promising to restore their ancient liberties; and in Dec. his brother, Don Alfonso, assumed command of the Carlist forces in Catalonia. Don Carlos himself made his entry to Spain, July 15, 1873, announcing that he came for the purpose of saving the country. Thenceforward there was incessant war in the n. part of the kingdom or the republic, in which there were victories on both sides; but for the most part the battles were unfavorable to the Carlists, until Feb., 1876, when their cause was completely crushed at Tolosa, the defenders of that last stronghold flying in a panic toward France. Don Carlos went to Paris, where, Mar. 3, 1876, he proclaimed: "Being desirous of putting a stop to bloodshed, I forbear continuing a glorious but at present fruitless struggle. In the face of a great superiority of numbers, and in view especially of the sufferings of my volunteers, it becomes necessary to return the sword to the scabbard. I will never sign a convention [abandonment of all claims]." He was expelled from France, in 1881, for ostentatiously supporting the cause of the Duc de Chambord. Don Carlos has five children, four daughters and a son.

**CARLOS, SAN**, a t. of Venezuela, South America, in a valley on the Aguaré, a feeder of the Orinoco, 120 m. s.w. of Caracas. Before the wars of independence it was a place of considerable importance, having been one of the richest towns in the province. The town is handsome and well laid out. Pop. with district, about 10,400.

**CARLOS DE BOURBON**, DON MARIA ISIDOR, b. Mar. 29, 1788, was the second son of Charles IV. of Spain, and was educated chiefly by priests. After the expulsion of the French from Spain, his brother, Ferdinand VII., reascended the throne; but having married thrice without issue, Don C. began to cherish the hope of succeeding his brother. An insurrection in his interest broke out in 1825, in Catalonia; but was put down, Don C. himself not participating in it. A fourth time, however, the indefatigable Ferdinand married, and the result was a daughter, the infanta Maria Isabella (late queen of Spain), b. Oct. 10, 1830. Now, as the Salic law, excluding females from succession to the throne, had been abrogated, the hopes of the Carlists, as the followers of Don C. were called, were destroyed. During the illness of the king, in Sept. 1832, the Carlists succeeded so far as to win from him a re-institution of the Salic law; but he revoked it again as soon as he had partially recovered, and thus Don C. was again disappointed. As he still continued his agitation, he was banished, in 1833, to Portugal, and soon afterwards was commanded to reside in the papal states. But before C. had embarked for Italy, king Ferdinand VII. died, Sept. 29, 1833. Don C. was now recognized as heir to the throne of Spain, not only by the Carlists but also by Dom Miguel in Portugal; and having refused to obey the queen-regent's order for his deportation to Italy, he was declared a rebel, Oct. 16, 1833. By the quadruple alliance of Spain, Portugal, England, and France, both C. and Dom Miguel were banished from Portugal, and in June, 1834, the former embarked for England. In the following month, he returned to the continent, passed in disguise through France into Spain, where he excited an insurrection in the northern provinces, but was ultimately compelled to escape into France. In 1836, his claims to the throne were unanimously rejected by the constituent cortes. In 1844, he abdicated in favor of his eldest son; and died at Trieste, Mar. 10, 1855.—DON CARLOS, his son, b. 1818, was better known as the count de Montemolin. This second pretender made an attempt, in 1849, to pass

under a disguise through France into Spain, but failed. In 1860, a Carlist insurrection was once more attempted, in consequence of which the count de Montemolin and his brother were arrested, but liberated after the former had signed a renunciation of all his claims to the Spanish throne. He d. in 1861. The present representative of his pretensions is his nephew, Don Carlos, son of his brother Juan, b. 1848. On his behalf, Carlist risings—speedily repressed—took place in 1869, 1870, and 1872; but the insurrection headed by Don Carlos, after the abdication of king Amadeo, in 1873, proved much more formidable, and kept the northern provinces of Spain in great confusion till the beginning of 1876, when it was crushed. See CARLOS, MARIA DE LOS, etc.

**CARLOTTA**, Ex-Empress of Mexico (**MARIE CHARLOTTE AMÉLIE AUGUSTE VICTOIRE CLÉMENTINE LÉOPOLDINE**), the daughter of Leopold I., king of the Belgians, was born in 1840, and married, at the age of seventeen, Maximilian, archduke of Austria, afterward emperor of Mexico. She accompanied him to Mexico in 1864, where by the suggestion and advice of Napoleon III. he had been invited by the Mexican people. The empress remained with him until, owing to the embarrassments which beset him, he found it imperative to send her to France, in order to seek aid from Napoleon, from whom he expected every assistance. Her mission was fruitless. She applied then to the Pope, for, previous to his departure for his new empire on the western hemisphere, Maximilian had visited the Pope and received his blessing. To His Holiness the empress went, but was again doomed to disappointment. Her failure to change the current of events by her mission to Europe, and the disastrous consequences attending the closing days of the empire, broke her heart, and her reason gave way under the terrible pressure of her afflictions. She was taken to the chateau of Laeken, not far from Brussels, and, while her recovery is considered hopeless, she is constantly engaged in her apparently lucid intervals in writing *Memoirs of the History of the Mexican Empire*. See MAXIMILIAN.

**CARLOVINGIANS**, the second dynasty of Frankish kings. The origin of the family is traced to Arnulph, bishop of Metz, who d. in 681. His son, Anségise, married a daughter of Pepin (q.v.), of Landen, in Austrasia. His sons, Martin and Pepin d'Héristall, as the greatest territorial lords in Austrasia, were called to the office of mayor of the palace. Martin was assassinated; Pepin, by force of arms, compelled the weak Merovingian king, Theodoric III., to invest him with the office of mayor of the palace in all the three Frankish states, Neustria, Austrasia, and Burgundy. Pepin allowed the Merovingian kings to remain upon the throne, but they were kings only in name. He d. on 17th Dec., 714, and left as his successor, his young grandson, Theodoald; but Charles Martel (q.v.), a natural son of Pepin, was made mayor of the palace by the Austrasians, and in this capacity subjected the three states to his power. He d. in 741. His two sons, Carloman, and Pepin le Bref, divided the kingdom, although for a time the nominal Merovingian dynasty still subsisted; but Pepin at last formally assumed the royal power, and was crowned king of the Franks on 8d May, 753. This is the formal commencement of the Carolingian dynasty. Pepin began the conquest of Italy. His sons, Carloman and Charles the Great or Charlemagne (q.v.), succeeded him, of whom the latter soon reigned alone, and prodigiously extended his dominions. In 800, pope Leo III. set upon his head the crown of the western Roman empire. He divided his dominions amongst his sons, of whom, however, only one, Louis le Débonnaire, survived him, who, in the list of the kings of France, appears as Louis I., but who was properly emperor and king of the Franks. With Charlemagne, however, the high abilities of his family suddenly disappeared, and his successors showed much weakness of character. Family feuds broke out during the life of Louis le Débonnaire, who had divided his dominions in part amongst his sons, and he terminated an inglorious reign in 840. By a treaty concluded in Aug. 843, Lotharius I., the eldest son of Louis, obtained the imperial crown and the kingdom of Italy, with Lorraine, Franche Comté, Provence, and the Lyonnais; Louis, his brother, called Louis the German, obtained the German part of his father's dominions; and Charles the Bald, the son of a second marriage, obtained Neustria, Aquitania, and the *Spanish Mark*, and may almost be regarded as the founder of the French monarchy. The emperor Lotharius I. died in 855, and his dominions were again divided—his eldest son, Louis II., being emperor and king of Italy, and his two other sons kings of Lorraine and of Provence, but their kingdoms reverted to the emperor.—Charles the Fat, a son of Louis the German, having become emperor, was elected by the French nobles to be their king in 882; and being previously in possession of Italy and Germany, united under his sway great part of Charlemagne's empire. But he was a weak monarch, and was deposed in 887. The imperial dignity passed by the marriage of the daughter of the emperor Arnulph with Fritziar, count of Franconia, to another family. The French dynasty, of which Charles the Bald may be deemed the founder, continued in a succession of weak monarchs for about a century, till it terminated with the reign of Louis V., on whose death, Hugh Capet, the most powerful nobleman in France, seized the crown in 987. The Carolingian kings had for some time previous possessed no real power. A subsequent marriage, however, connected their family with that of the Capets, and enabled the kings of France to trace their descent from Charlemagne.

**CARLOVITZ**, or **KARLOVICZ**, a t. of Hungary; in Croatia-Slavonia. It is situated on the right bank of the Danube, about 8 m. s.s.e. of Peterwardein, and is noted for its

excellent wine, and for the treaty concluded here in 1699. The wine—especially the red variety—ranks with the best and strongest obtained in Hungary, and in some years the product has amounted to about 1½ million of gallons. Pop. abt. 5,500. The important treaty or peace of C. was concluded, in 1699, between the allies Austria, Russia, Poland, and Venice on one side, and the Porte on the other, and included the following articles: "That Austria should repossess the territories captured by the Turks during two centuries (which included Hungary and Slavonia, and she also acquired Transylvania): that Venice should hold the Morea as far as the isthmus; that Poland should take back Podolia and the lands in the Ukraine conquered by Mohammed IV., but should cede certain places in Moldavia; and that Russia should have the territory of Azof."

**CARLOW**, the capital t. of Carlow co., Ireland, situated at the confluence of the Burren and the Barrow, 56 m. s.w. of Dublin by rail. It is a well-built town, with two principal streets, from which branch many smaller ones, and a suburb, Graigue, in Queen's co., on the opposite side of the river, with which it is connected by a bridge. It has a Roman Catholic cathedral and divinity college. C. has extensive flour-mills, and is the emporium for the agricultural produce of the district, largely exported from this place. Pop. '91, 6,600. It returns one member to parliament. There are here the remains of a castle, picturesquely situated on an eminence on the Barrow, founded in 1180 by sir Hugh de Lacy. In 1861, the duke of Clarence established the exchequer of the kingdom in this place. It constituted one of the boundaries of the PALE, beyond which the king's writ was not recognized by the "Irishry." Its first charter was granted in the 18th c. by William Marshall, earl of Pembroke. The town grew up around this castle, which was several times besieged by, and alternately in the possession of, the English and Irish. The castle (one of great extent) was in the possession of the insurgents in 1650, when it was closely invested by Gen. Ireton and the republican army. The garrison surrendered on conditions to sir Hardress Waller, whom Ireton had left to conduct the siege. It was then dismantled; and about one half of this once stately castle now remains a picturesque ruin. In the Irish insurrection of 1798, the insurgents attacked the town, but were repulsed by the garrison and yeomanry, and 600 of them killed. The Barrow is here navigable for small-craft to its junction with the Grand canal at Athy.

**CARLOW**, a small inland co. of Ireland, in Leinster province, with an area of about 349 sq. m., of which 4ths are arable. C., except in the southern extremity, where it is hilly, is a triangular fertile level, or gently undulating plain, between the Wicklow and Wexford range of hills on the e., and the highlands beyond the Barrow on the west. The chief rivers are the Barrow and Slaney. C. consists chiefly of granite, covered in the middle plain, or richer tracts, by limestone gravel, on which are fine loams and pasture. In the uplands, the soil is gravelly. Lower, carboniferous limestone crops out in the valley of the Barrow. On the w. side of the co. begins the great coal district of Leinster. In 1876, 79,345 acres were under crop, the chief crops being oats, potatoes, barley, and wheat. There are many dairies on the plains. The chief exports are corn, flour, meal, butter, etc. Along the Barrow, which falls above a foot per mile, are a great many extensive corn-mills. Pop. '41, 86,228; '51, 68,059; 91, 40,936. It returns two members to parliament—one for the co. at large, and one for the borough of Carlow. The chief towns are Carlow, Tullow, and Bagenalstown. At Old Leighlin a synod was held, in 630, to settle the time of Easter. Several engagements occurred in the co. during the Irish rebellion of 1798. The chief antiquities of C. are cromlechs, castles, and the cathedral church of Old Leighlin. A cromlech near Carlow town has a covering stone 23 ft. long, and of nearly 90 tons.

**CARLOWITZ.** See CARLOVITZ.

**CARLSBAD**, or KAISER-KARLSBAD, a t. in Bohemia, much celebrated for its hot mineral springs, and frequented in summer by visitors of the most aristocratic character from all parts of Europe. The permanent population does not amount to more than about 12,000, who are very industrious, making carpets, knives, scissors, needles, wood-work, and articles of Bohemian glass, such as are likely to induce visitors to purchase. The visitors in a season, which usually lasts from 15th June to 15th Aug., amount to more than 30,000. The wells have been frequented from a very early period, but have been of great celebrity since the 14th century. The scenery is extremely beautiful. The town is well built, the accommodation for guests good, and the place free from some of the abuses too common at other German spas. No gaming-houses exist here. The temperature of the hot springs varies from 117° to 167° Fahrenheit. The principal spring, the Sprudel, has a very large volume, and is forced up to a height of 3 ft. from the ground. Great quantities of the water and salt are exported. The principal ingredients in the water are sulphate of soda, carbonate of soda, and common salt. The whole town of C. appears to stand on a vast caldron of boiling water, which is kept from bursting only by the safety-valves the springs provide. On one occasion, after an explosion, poles of 30 fathoms in length, thrust into the aperture, did not reach the bottom. A congress of German powers, held here in Aug., 1819, issued the so-called Carlsbad decrees (q. v.). See Kraus, *Carlsbad* (Lond., 1888).

**CARLSBAD DECREES.** The resolutions passed at congress at Carlsbad in 1819 by the representatives of the German states under the leadership of Austria. They opposed

the granting of state constitution, reviving a strict censorship of the press, and placed the universities under police supervision. Another feature was the appointment of a central commission of inquiry for the purpose of seeking out secret societies, and directed especially against the so-called Burschenschaft which was regarded as a revolutionary organization. Their effort was to crush out the liberal spirit in the German states.

**CARLSBURG**, or **KARLSBURG**, a t. of Transylvania, situated on the right bank of the Maros, here crossed by a bridge some 200 yards in length, 48 m. s. of Klausenburg. It is built partly on a hill, and partly in a valley, is fortified, and has a citadel surrounded by walls with bastions. Gold and silver, obtained from the mines of Transylvania, are purified and coined here. The only manufacture of importance is saltpeter. Maros Porto, the chief shipping-place for Transylvanian rock-salt, is within half a mile of the town. C. occupies the site of the ancient *Apulum*, remains of which are still found. Pop. '90, 8,200.

**CARLSKRONA**, capital of the province of the same name in Sweden, is situated on the rocky island of Trotsö, and its adjoining islets in the Baltic, which are connected by bridges, in lat. 56° 9' n., long. 15° 35' east. The town was built in 1680 by Charles XI., who gave it his own name, and conferred upon it several important privileges, besides making it the great naval station and arsenal of Sweden, instead of Stockholm. It has a magnificent harbor, with a sufficient depth of water to float the largest vessels. The only practicable entrance for large ships is defended by two strong forts. The dry-docks, blasted out of the granite rock at vast expense, are an attraction to strangers. The inhabitants are chiefly employed in connection with the arsenal. Pop. 96, 22,496.

The province of C. or Blekinge is situated in the s. of Sweden, in lat. 56° to 58° 30' n., long. 14° 30' to 16° east. It has the Baltic on its s. and e. margins. It has an area of about 1164 sq. m. with a pop. of 143,387 in 1896. It is hilly without being mountainous, and generally fertile, yielding rye and potatoes abundantly, and also wheat, oats, and peas. The fisheries employ a large number of the inhabitants.

**CARLSHAMN**, a fortified t. on the s. coast of Sweden, about 80 m. w. of Carlskrona, at the end of a beautiful valley. The harbor is small but secure, and a considerable trade in iron, timber, pitch and tar is carried on. There are manufactures of sail-cloth, tobacco, hats, soap, and leather; there are also dye-works and shipbuilding yards. Pop. abt. 7200.

**CARLSRUHE**, the capital of the grand duchy of Baden, is situated a few miles eastward from the Rhine. It was founded by the Markgraf Charles-William of Baden-Durlach, in 1715, and built on a curious and regular plan in connection with the palace, which constitutes the center point from which the streets, so far as constructed, diverge in the shape of an extended fan. The streets are wide and well paved. There are a number of fine buildings; flourishing educational institutions; the court library contains 80,000 volumes; a public library, 90,000; and there are valuable collections of antiquities, objects of natural history, etc. An aqueduct from the Durlach supplies the town with water. In the market-place, which is the finest of the public squares, a stone pyramid incloses the remains of the founder of the city. The manufactures include machines of various sorts, carriages and wagons, jewelry, carpets, chemical products, furniture, tools, pottery, and cloth. C. is generally spelled *Karlsruhe*. Pop. 1896, 83,997.

**CARLSTAD**, a t. of Sweden, on the island of Tingvalla, in lake Wenern, about 160 m. w. of Stockholm. It is connected with the mainland by two bridges, one of which is a large and very handsome structure. The town is well built, has a cathedral, cabinet of natural history, etc., and commands extensive views of the most beautiful scenery. Its trade is large, consisting in exports of iron, copper, timber, and corn. Pop. 8000.

**CARLSTADT**, a t. of Croatia-Slavonia, in Austria-Hungary, situated in a rich plain between the rivers Kulpa and Korona, 25 m. s.w. of Agram. It is fortified—the original fortress having been erected in the 16th c. to resist the Turks—has an old castle, and armory of 30,000 stand of arms. It has a large garrison, the Austrian executive looking upon it as a place of considerable importance, on account of its position on a navigable river, and on the great road into the center of Croatia from the coast. It has few manufactures, but an active transit trade. Pop. 5,600.

**CARLSTADT**, **KARLSTADT**, or **KARLOSTADT** (real name **ANDREAS RUDOLF BODENSTEIN**), 1480-1541; a German reformer, at first a friend and afterwards an opponent of Luther. He became a professor in Wittenberg, first in philosophy and then in theology, and in 1511 was rector of the university, about which time he became a personal friend of Luther. Carlstadt went to Rome to study canon law, returning to Wittenberg in 1515, where he took up the defense of Reuchlin, the scholar against whom a violent persecution was raging. In 1517, he published arguments asserting the supreme authority of the Scriptures, and declaring that in the silence of Scripture, appeals from the fathers of the church must be made to reason. When Luther nailed his thesis to the door of the church, Carlstadt supported him. In the bill against Luther, Carlstadt was especially named and condemned; and he was the first to appeal from the pope to a general council. In 1521, by invitation of the king, he went to Denmark to

teach the doctrines of the reformation; but he soon returned. About this time, differences sprang up between Carlstadt and Luther, owing to the former's hot-headedness; he demanded violent measures, where Luther desired prudence and patience. While Luther was imprisoned, Carlstadt greatly impaired the cause by his extreme course, and at last Luther declared against him. Being compelled to leave Wittenberg, Carlstadt became a pastor in Thuringia, where his violence created a suspicion that he was associated with Anabaptists, and that he might be implicated in the schemes of the peasant revolt. The elector sent Luther to find out the true state of affairs; and when Luther preached against Carlstadt at Jena, they held a discussion on the "real presence," which Carlstadt was the first to deny, and an open quarrel broke out between them. Carlstadt was ordered out of Saxony, and wandered from place to place exciting tumults, and prompting the people to destroy pictures and images in the churches. Again suspected of provoking insurrection, he was pursued and exposed to hardships, and even danger to his life. In this extremity he appealed to Luther, through whose influence he was permitted to return to Saxony, where for some years he led a quiet life. This quiet was unendurable by his restless spirit, and he once more attacked Luther; the controversy, in which Zwingli agreed with Carlstadt in his views of the Lord's supper, grew fiercer than ever, and Carlstadt, who was no longer permitted to dwell in Saxony, fled to Friesland, and thence to Switzerland, where Zwingli's influence made him a pastor, and afterwards an archdeacon at Zurich. In 1584, he settled as professor of theology in Basel, remaining there until his death. He was the first priest to write against celibacy, and the first Protestant clergyman to take a wife.

**CARLTON**, a co. in n.e. Minnesota, on the Wisconsin border, intersected by the Northern Pacific and Lake Superior railroads; 860 sq.m.; pop. '90, 5272. Surface uneven, and for the most part covered with maple and pine trees. Co. seat, Carlton.

**CARLTON**, THOMAS, D.D., 1808-74; b. N. H.; a Methodist minister, who in 1829 began his work in the Western New York conference in Rochester, Buffalo, and other places. He was for 20 years the principal agent of the Methodist book concern in New York city.

**CARLUDOVICA PALMATA**, a South American shrub or tree bearing the leaves from which Panama hats are woven, the best of which are plaited from a single leaf, the work requiring many weeks of labor.

**CARLUKE**, a municipal burgh in the middle of Lanarkshire, near the right bank of the Clyde, 6 m. n.w. of Lanark. Pop. '91, 4116. The neighborhood is rich in coal, iron, and limestone, and mining is the chief industry of the place. The orchards around cover 130 acres. Not far off is Lee, the seat of the Lockharts, where is preserved the famous Lee penny, noticed by sir W. Scott in the *Talisman*.

**CARLYLE**, JANE WELSH. See **CARLYLE**, THOMAS.

**CARLYLE**, JOSEPH Dacre, 1759-1804; educated at Cambridge, and a fellow of Queens' college. He succeeded Dr. Paley as chancellor of Carlisle, and in 1794 was appointed professor of Arabic at Cambridge. He had already published a translation of an Arabic history of Egypt, and in 1796 he issued a volume of *Specimens of Arabic Poetry*. Lord Elgin procured Carlyle's appointment in the Turkish embassy, which gave him an opportunity to travel in the east, where he collected Greek and Syriac manuscripts for a contemplated revision of the New Testament, but he did not live to do the work.

**CARLYLE**, THOMAS, was b. 4th Dec., 1795, in the t. of Ecclefechan, parish of Hoddam, Dumfriesshire, Scotland. Educated first at the parish school, and afterwards at Annan, he passed to Edinburgh university, with a view to entering the Scottish church, in his 15th or 16th year. Here he studied irregularly, but with amazing avidity. The stories which are related of his immense reading are almost fabulous. About the middle of his theological curriculum, C. felt wholly disinclined to become a clergyman, and, after a short period spent in teaching at Dysart, in Fifeshire, he embraced literature as a profession. His first efforts were contributions to Brewster's *Encyclopædia*. In 1824, he published a translation of Legendre's *Geometry*, to which he prefixed an essay on proportion, mathematics having, during his college years, been a favorite study with him. In 1823-1824, had appeared in the *London Magazine* his *Life of Schiller*, and, during the same year, his translation of Goethe's *Wilhelm Meister*. In 1825, the *Life of Schiller* was recast, and published in a separate form. It was very highly praised; indeed, one can discern in the criticisms of the book certain indications of the genius of Carlyle. The translation of *Wilhelm Meister* met with a somewhat different fate. De Quincey, in one of his acrid and capricious moods, fell foul both of Goethe and his translator; while lord Jeffrey, in the *Edinburgh Review*, admitting C. to be "a person of talents," slashed in cavalier fashion at the book. In 1827, C. married Miss Welsh, a lineal descendant of John Knox, and, during the same year, appeared his *Specimens of German Romance* (4 vols., Tait, Edinburgh). From 1827 to 1834, he resided chiefly at Craigenputtock, a small property in Dumfriesshire, belonging to his wife—the "loneliest nook in Britain," as he says himself in a letter to Goethe, "fifteen

m. n. w. of Dumfries, among the granite hills and the black morasses which stretch westward through Galloway almost to the Irish sea." Here C. revolved in his mind the great questions in philosophy, literature, social life, and politics, to the elucidation of which—after his own singular fashion—he has earnestly dedicated his whole life. Here, also, he commenced to write the splendid series of critical and biographical essays which first familiarized Englishmen with the riches of modern German thought. For this work, he was incomparably better fitted than any man then living in Great Britain. Possessing a knowledge of the German tongue such as no foreigner ever surpassed, he was also inspired by the conviction, that the literature of Germany, in depth, truthfulness, sincerity, and earnestness of purpose, was greatly superior to what was admired and relished at home. Gifted, moreover, in a degree altogether unexampled, with a talent for portraiture, he soon painted in ineffaceable colors on the British memory, the images of Schiller, Fichte, Jean Paul Richter, and other foreign magnates, until then almost unheard of. Gradually, educated circles awoke to the fact, that a literary Columbus had appeared among them, who had discovered a "new world" of letters, the freshness and grandeur of which were sure to attract, sooner or later, multitudes of adventurous spirits. One of his most beautiful, eloquent, and solid essays written at Craigenputtock, was that on *Burns* (*Edinburgh Review*, 1828). It has given the tone to all subsequent criticism on the Scottish poet. The article on *German Literature*, in the same periodical, is a masterly review of a subject, the importance of which C. at length succeeded in compelling his countrymen to acknowledge. But his *chef-d'œuvre* written on the moorland farm, was *Sartor Resartus* ("the tailor done over," the title of an old Scottish song). This work, like all his after-productions, an indescribable mixture of the sublime and the grotesque, was offered to various London firms, and rejected on the advice of their sapient "tasters," and at length published in successive portions in *Fraser's Magazine* (1833-34). It professes to be a history or biography of a certain Herr Teufelsdröckh ("Devil's Dirt"), professor in the university of Weissnichtwo ("Kennaquhair"), and contains the manifold opinions, speculations, inward agonies, and trials of that strange personage—or rather of C. himself. The whole book quivers with tragic pathos, solemn aspiration, or riotous humor. Carlyle removed to London, at about this time. In 1837, appeared the first work which bore the author's name, *The French Revolution, a History*. Nothing can be more gorgeous than the style of this "prose epic." A fiery enthusiasm pervades it, now softened with tenderness, and again darkened with grim mockery, making it throughout the most wonderful image of that wild epoch. C. looks on the explosion of national wrath as a work of the divine Nemesis, who "in the fullness of times" destroys, with sacred fury, the accumulated falsehoods of centuries. To him, therefore, the revolution is a "truth clad in hell-fire." During the same year, he delivered in London a series of lectures on *German Literature*; in 1838, another series on *The History of Literature, or the Successive Periods of European Culture*; in 1839, another on *The Revolutions of Modern Europe*; and a fourth in 1840, on *Heroes, Hero-Worship, and the Heroic in History*; of these only the last has been published. Meanwhile, the first edition of his *Miscellanies* (contributions to the reviews) had appeared in 1838, and his *Chartism* in 1839. In 1843, followed *Past and Present*, which, like its predecessor, showed the deep, anxious, sorrowful interest C. was taking in the actual condition of his countrymen. In 1845, he published what is by many considered his masterpiece—*Oliver Cromwell's Letters and Speeches, with Elucidations and a Connecting Narrative*. The research displayed in this book is something marvelous, but the author has been nobly rewarded for his toil, inasmuch as his vindication of the protector's character is most triumphant. To C. has thus fallen the unspeakable honor of replacing in the pantheon of English history the statue of England's greatest ruler. In 1850, the  *Latter-Day Pamphlets*, the fiercest, most sardonic, most furious of all his writings, came out. The violence of the language in these pamphlets offended many. Next year (1851) appeared the *Life of John Sterling*—a biography of intense fascination for the younger intellects of the age. In 1858-1860, C. published *The History of Frederick the Great*; and in 1865 he was elected lord rector of Edinburgh university.

The sudden death of Mrs. Carlyle, in 1866, overwhelmed her husband with grief, and to grief was added remorse, when he discovered from some of her letters and from her journal that his ill-temper and selfishness had caused her much misery and ill-health. It is a fact also that during 1855-56 they were for a time estranged, owing to C.'s liking for the society of Harriet, Lady Ashburton. In 1867 C. visited Mentone, where he composed part of his personal *Reminiscences*; then, returning to London, contributed to *Macmillan's Magazine* an article entitled "Shooting Niagara," and giving his views of British democracy. In 1875 he added to a special edition of his works a new volume containing "The Early Kings of Norway," and an "Essay on the Portraits of John Knox." In 1874 he received the Prussian royal order "for merit" in recognition of his having written the life of Frederick the Great, and in the same year was offered by Mr. Disraeli the Grand Cross of the Bath (with the alternative of a baronetcy) and a liberal pension, but he declined them both. In 1881, Feb. 4, he died at his house in Chelsea. A burial in Westminster Abbey was offered, but his wish to be buried among his kindred at Ecclefechan was respected. His wife is buried beside her father at Haddington.

C. appointed James Anthony Froude his literary executor, who, in conformity with

the terms of the trust, published *Carlyle's Reminiscences* (1881); *Thomas Carlyle: the First Forty Years of his Life* (1882); *Letters of Jane Welsh Carlyle*, exhibiting her as an accomplished woman and brilliant letter-writer (1883), and *Thomas Carlyle: Life in London* (1884). A revulsion of feeling followed; the literary world being shocked by the bitterness and spite abounding in these records; Mr. Froude was attacked with great violence for disclosing these defects, and a subscription that had been started for a monument was abandoned; but time revived the old-time admiration for Carlyle's genius, his noble aims, and his perfect sincerity. See *The Correspondence of Thomas Carlyle with Ralph Waldo Emerson* (Boston, 1883); *Early Letters of Thomas Carlyle* (N. Y., 1886; second series, 1888); *Correspondence between Goethe and Carlyle* (N. Y., 1887); all edited by Prof. C. E. Norton. See also Wylie, *Thomas Carlyle, the Man and his Books* (1881); Masson, *Carlyle, Personally and in his Writings* (1885); Larkin, *The Open Secret of Carlyle's Life* (1886); Garnett, *Life of Thomas Carlyle* (1887).

**CARMAGNOLE**, the name of a popular song and dance, which was notorious as the accompaniment of many excesses in the French revolution. It first became popular in the s. of France, where it was named after Carmagnole, in Piedmont, the home of many Savoyard boys who played the tune. The song began with:

Madame Vêto avait promis,

and every verse ended with the refrain:

Dansons la Carmagnole—vive le son—du canon!

Fashion soon adopted the word, which was next applied to a sort of jacket, worn as a symbol of patriotism. Afterwards it was applied to the bombastic and fanatical reports of the successes and glory of the French arms. With the reign of terror, the song and the jacket, associated with so many dismal recollections, together disappeared.

**CARMEL** is a mountain-ridge, 6 or 8 m. long, stretching nearly n. and s. from the plain of Esdraelon into the sea, the only great promontory on the low coast of Palestine. It is composed of a whitish stone, in which flints, sometimes curiously shaped, are imbedded. The height has been variously stated, but is probably about 1500 ft. above the level of the plain. On the e. is the river Kishon, and the plain of Esdraelon; on the w., a small plain descending to the sea. Oaks, pines, olives, laurels, and other trees grow abundantly on the mountain; and various wild-fruits evince its ancient fertility and cultivation. The name C. means *the garden of God*, or "a very fruitful region." Mt. C. is renowned in Jewish history, and is often alluded to in the imagery of the prophets. On the summit of Mt. C., there is a monastery called Elias, after the prophet Elijah, the monks of which take the name of "Carmelites." It is built on the supposed site of the grotto where Elijah lived, and the spot where he slew the priests of Baal.

**CARMEL, KNIGHTS OF THE ORDER OF OUR LADY OF MOUNT**, were instituted by Henry IV. of France, and incorporated with the order of the knights of St. Lazarus of Jerusalem. The order of Mt. C. consisted of 100 gentlemen, all French, who were to attend the king in his wars, and had considerable revenues assigned to them. The order was confirmed by bull by pope Paul V., in 1607.

**CARMELITES**, or **ORDER OF OUR LADY OF MOUNT CARMEL**, a monastic order probably founded as an association of hermits on Mt. Carmel by Berthold, count of Limoges, about 1156. A legend, however, ascribes the foundation of the order to the prophet Elijah; and another makes the Virgin Mary to have been a Carmelite nun. Driven out by the Saracens in the 13th c., the C. wandered over Europe; and Simon Stoch, their general, changed them into a mendicant order in 1247. From that time, they shared in the usual vices of the mendicant orders. They subsequently divided into several branches, more or less rigid in their rules, one distinguished by walking barefooted. They exist at the present day in many Roman Catholic countries.—The order of *Carmelites*, or *Carmelite nuns*, was instituted in 1452, and is very numerous in Italy.

**CARMEN SYLVA**. See ELIZABETH, QUEEN OF ROUMANIA.

**CARMINATIVES** (from Lat. *carmen*, a charm), medicines to relieve flatulence and pain in the bowels, such as cardamoms, peppermint, ginger, and other stimulating aromatics.

**CARMINE**, or **CARMIN** (Arabic, *kermes*), is a beautiful red pigment obtained from cochineal, and which is employed in the manufacture of the finer red inks, in the dyeing of silk, in coloring artificial flowers, and in miniature and water-color painting. It was first prepared by a Franciscan monk at Pisa, who discovered it accidentally, while compounding some medicine containing cochineal; and in 1656, it began to be manufactured. It is the finest red color known, and was more largely used formerly than now for imparting a healthy aspect to the cheek of beauty. One process for its preparation is to digest 1 lb. of cochineal in 8 gallons of water, for 15 minutes; then add 1 oz. of cream of tartar; heat gently for 10 minutes; add half an oz. of alum; boil for 2 or 3 minutes; and after allowing any impurities to settle, the clear liquid is placed in clean glass pans, when the C. is slowly deposited. After a time, the liquid is drained off, and the C. dried in the shade. In the preparation of C., much depends on a clear atmosphere, and a bright sunny day, as the pretty color of the C. is never nearly so good when it has been prepared in dull weather, and this accounts in great part for the superiority of



French C. over that prepared elsewhere. The great expense of pure C. has led to the fabrication and vending of substitutes. The *rouge* of the theaters is made from red sandal-wood, Brazil wood, benzoin, and alum, which are boiled in brandy or vinegar till a paint of an intense red color remains. A more harmless material is obtained by evaporating the mixture till the liquid is driven off, and making up the red residue with balm of Mecca, spermaceti, or butter of cacao. The depth of the red tint may be lessened by the addition of chalk. The little color-saucers called *rouge dishes*, obtained from Portugal, contain pure C.; but imitations are made in London. *Spanish wool* and *oriental wool*, which are impregnated with red paint, intended for use on the cheek for improving the complexion, are seldom genuine.

**CARMÖÉ**, or **KARMÖE**, an island of Norway, at the entrance of the Bukke fiord, in the North sea, and 20 m. n.w. of Stavanger, in lat. 59° 20' n., long. 5° 15' east. A strait 2 m. in width separates it from the mainland. With a length of 21 m., and an average breadth of 5, it has a small population, who are principally engaged in the fisheries, and in cattle-rearing.

**CARMO'NA**, a. t. of Andalusia, Spain, 20 m. n.e. of Seville. It is situated on an elevated ridge, overlooking a rich and olive-clad plain, and its old massive Moorish walls and castle give it a very picturesque appearance. It has a fine old Gothic church, and the gate of Cordova is a most interesting piece of architecture. It has manufactures of woolen cloth, hats, leather; also flour and oil mills, and an important annual cattle-fair. Pop. 17,500.

**CARNAO**, a village in the department of Morbihan, France, 17 m. s.e. of Lorient. It is remarkable on account of the great Celtic monument situated about three quarters of a mile from the village, on a wide desolate plain near the sea-shore. The monument consists of 10,000 to 12,000 rude broken obelisks of granite, resting with their smaller ends in the ground, rising, many of them, to a height of 18 ft., though a large proportion does not exceed 8 ft., and arranged in 11 parallel rows, forming 10 avenues extending from e. to w., and having at one end a curved row of 18 stones, the extremities of which touch the outer horizontal rows. The origin and object of the monument remain a mystery. Similar but smaller structures are found to the w. of C., at Erdevan and St. Barbe. Pop. 8000.

**CARNAHUBA PALM**, or **CARANAIBA PALM**, *Copernicia cerifera*, a very beautiful species of palm, which abounds in the northern parts of Brazil, in some places forming vast forests. It attains a height of only 20 to 40 ft.; but its timber is valuable, is used in Brazil for a great variety of purposes, and is imported into Britain for veneering. The fruit is black, and about the size of an olive; it is sweet, and is eaten both raw and prepared in various ways. Scales of wax cover the under side of the leaves, and drop off when the fallen and withered leaves are shaken. Being collected in this way, the wax is melted into masses; and beeswax is often adulterated with it. It has been imported, and used in the manufacture of candles, but no method has yet been devised to free it of its yellowish color. See *illus.*, *PALMS*, ETC., vol. XI.

**CARNARIA** (Lat. *caro*, *carnis*, flesh), the Latinized form of the French *carnassiers*, the name given by Cuvier to a great order of *mammalia*, which, according to his system, includes all the not marsupial *feræ* of Linnæus, and along with them the bats, from the Linnæan order *primates*. The C. have the toes terminated by claws; none of them have an opposable thumb on any of the extremities; they have incisors or cutting teeth, canine teeth or tusks, and molar teeth or grinders, but their dentition varies according to their kind of food, some preying on insects, others on the higher animals, whilst many of them are by no means exclusively addicted to animal food, but subsist in great part, and a few bats entirely, on vegetable substances. Cuvier at first included the marsupial quadrupeds in this order; but afterwards, recognizing more fully the great importance of the characteristic from which they derive their name, constituted them into a distinct order, the remaining C. being divided into *cheiroptera* (bats, q.v.), *insectivora* (q.v.), and *carnivora* (q.v.).

**CARNARVON**, HENRY HOWARD MOLYNEUX HERBERT, fourth earl of, b. in Grosvenor square, 1831. His family is a branch of the house of Herbert, earls of Pembroke, springing from maj.gen. the Hon. W. Herbert, whose son, Henry, was created, in 1780, baron Porchester of Highclere, Hampshire, and advanced to the earldom of Carnarvon in 1793. The present earl was educated at Christ Church, Oxford, where he was first-class in classics in 1852. His father dying before he was of age to sit in the house of commons, he lost the advantage of the training in public speaking and statesmanship which the sons of peers usually enjoy during the lifetime of their parents, in the lower house. He took his seat on the conservative benches, and soon showed himself ambitious of parliamentary distinction. His earlier speeches in the house of lords were not thought to exhibit much vigor and grasp of intellect, and were marred by a simpering and affected delivery. He was appointed governor of Carnarvon castle in 1854. In 1855, he became under-secretary of state for the colonies, in the administration of the earl of Derby. In 1859, he received the degree of D.C.L., and was elected high steward of the university of Oxford. He resigned office with the conservative ministry in 1859, and availed himself of the period of leisure thus obtained to visit the east. The feuds of the

tribes in the Lebanon had broken out in a massacre of the Christians; and the earl of C. gave the world the benefit of his investigations, in an interesting work, entitled the *Druses (q.v.) of the Lebanon*. On his return, he delivered lectures in the country, and speeches in the house of lords, on prison discipline, education, and other social subjects. When the conservatives again returned to power in 1866, C. accepted from lord Derby the office of secretary of state for the colonies, with a seat in the cabinet. In this he obtained for his colonial administration a large share of public confidence. He censured in calm and measured language the misconduct of the courts-martial during the Jamaica insurrection, and especially the trial and execution of Mr. Gordon; and the pacification of the colony satisfactorily progressed under his instructions. During the recess, he developed and framed a plan for the confederation of the British North American colonies; and when parliament met in 1867, he explained the provisions of the measure in an elaborate speech. The bill met with general approval in both houses, and it passed; but before it obtained the royal assent, C. had, with two other colleagues in the cabinet, resigned office upon the reform bill of the Derby government, which he regarded as democratic in its operation, and dangerous in its results. When the reform bill came before the house of lords, C., in an animated speech, vindicated his consistency at the expense of his colleagues; and in the discussions in committee, he addressed the house with great vigor and argumentative ability. He edited in 1869 a work by his father, who was an accomplished scholar. It is entitled *Reminiscences of Athens and the Morea; Extracts from a Journal of Travels in Greece during 1839, by the late Earl of Carnarvon*. He has also published one or two of his lectures. On Mr. Disraeli's return to power in 1874, lord C. resumed office as secretary of state for the colonies; but resigned in Jan. 1878. He was lord-lieutenant of Ireland in 1885-6. He published translations of the *Agamemnon* (1879) and the *Odyssey* (1886). Died in 1890.

**CARNARVON.** See CAERNARVON.

**CARNATIC**, a country of somewhat indefinite dimensions on the e. or Coromandel coast of the peninsula of Hindustan. While some carry it as far inland as the Western Ghats, others limit its breadth to about 75 miles. The length is generally taken from Cape Comorin to about 16° north. The C. is no longer a recognized division of the country, and exists only in history as the grand theater of the struggle of last century between France and England for supremacy in India.

**CARNATION**, one of the finest of florists' flowers, a double-flowering variety of the clove pink (*dianthus caryophyllus*, see PINK), and existing only in a state of cultivation. It has long been a universal favorite, both on account of its beauty and fragrance, although it does not appear to have been known to the ancients. The stem is about 3 ft. high, and generally receives support. There are varieties, called *tree carnations*, with much taller stems. See PINK.

**CARNATION** (from Lat. *caro*, flesh). Flesh-tints in painting are called carnations. The art of producing the true color of flesh, from the rarity with which it is acquired by artists, would seem to be one of the most difficult branches of coloring. Whether from their painting less from the nude than the old masters, or from some other cause, it is certain that the moderns, and particularly the English, have been very unsuccessful in this respect. It is said that the pigments must be laid on thick and pasty. The ochres are preferable to vermilion for the local colors; and ultramarine ashes, or Veronese green, mixed with asphaltum, may be used for the shadows.

**CARNEADES**, a Greek philosopher, b. at Cyrene, in Africa, about 218 B.C. He studied logic at Athens under Diogenes, but became a partisan of the academy, and an enemy of the stoics, whose stern and almost dogmatic ethics did not suit his skeptical predilections. Conspicuous for his eloquence and skill in "tongue-fence," he was destitute of any convictions moral or intellectual, and had even arrived at the conclusion that no criterion of truth existed in man. In 155 B.C., along with Diogenes and Critolaus, he was sent as ambassador to Rome, where he delivered two orations on justice, in the first of which he eulogized the virtue, and in the second proved that it did not exist. Honest Cato, who had no relish for intellectual jugglery, and thought it a knavish excellence at the best, moved the senate to send the philosopher home to his school, lest the Roman youth should be demoralized. C. died at Athens, 129 B.C. He was remarkable for his industry, negligent habits, and impatient temper.

**CARNEGIE, ANDREW**, manufacturer and philanthropist, was born in Dunfermline, Scotland, in 1835. His family emigrated to the U. S. in 1845, and settled in Allegheny, Penn. He was set to winding bobbins in a cotton factory; became later a messenger in the Atlantic and Ohio Telegraph Co., working himself up to superintendent. He made a fortune in oil; became interested in iron works at Pittsburg, Penn., and soon was known as the largest manufacturer of iron, steel rails, and coke in the world. Among his public gifts are those of a free library and baths to his native town, the Carnegie Laboratory for the New York Bellevue medical coll., and free libraries to Pittsburg, Allegheny City, Braddock, and Ayr, and Edinburgh. Becoming interested in English politics, he bought up several radical English newspapers, and was asked to stand for parliament, but declined to enter public life. In 1890 he was presented with the freedom of the city of Dundee. Besides contributing articles to leading periodicals, he

has published *Round the World; An American Four-in-Hand in Great Britain* (1883), describing a coaching trip with a party of English and American friends; and *Triumphant Democracy* (1886), an enthusiastic account of the social and material progress of the United States (revised edition, 1893).

**CARNELIA**, a festival in honor of Apollo among the ancient Spartans, taking its name from the Greek name of the month (August) in which it was celebrated. The celebration lasted nine days.

**CARNELIAN**, or **CORNELIAN**, in mineralogy, the name given to some of the finer varieties of chalcedony (q. v.). The color is blood-red or flesh-color, reddish brown, reddish white or yellow, more rarely milk-white. The fracture is in the common C. perfectly conchoidal, but there is a variety of a somewhat fibrous structure with a splintery fracture. C. is found in pieces of irregular form and in lamellar concretions. The finest specimens are brought from the east, but it is found in Scotland and in many parts of Europe and America. It is much used by the lapidary, and in the east it is prized beyond every other stone, the gems excepted. Bright red C. of unmixed color is most highly valued, but a mass of considerable size is seldom found with the color equal throughout.

**CARNIFEX FERRY**, in Nicholas co., Va., near which, Sept. 10, 1861, there was an engagement between the union forces under Gen. Rosecrans, and the confederates under Gen. Floyd, the latter being defeated with the loss of camp equipage and war material. Floyd escaped by retreating over Gauley river and destroying the bridge.

**CARNIOLA** (Ger. *Krain*), a crown-land of the Austrian empire, formerly part of the kingdom of Illyria, has an area of 8,856 sq. m. with a pop. (1890) of 498,958, being a decrease of nearly 40,000 as compared with the census return of 1854. A continuation of the Carinthian Alps passes through it in the north, and the Julian Alps in the south. The scenery of the country abounds in interesting and singular features, amongst which one of the most notable is the rock-bridge of St. Kanzian, 180 ft. high, and 160 ft. broad, with a perfect arch 62 ft. high, and 154 ft. long. The Save is the principal river; the Kulpa is its chief tributary. The singular lake of Zirknitz (q. v.) is in Carniola. The climate of C. is in general mild, except in the high mountainous parts. The country does not produce corn or cattle enough to supply the wants of its inhabitants. Millet, pulse, and wild fruits are principal articles of food with many of the lower classes. Maize is cultivated in some places, and some districts yield excellent wines and much fine fruit. Flax is largely cultivated; silk is produced in some places, and much honey and beeswax. The principal products of the mineral kingdom are iron, quicksilver, and marble; the quicksilver mines of Idria are exceedingly productive. Linen weaving, and the manufacture of a coarse lace, are common among the peasantry. Laibach is the capital.

C. received its present name after the settlement here of the Slavonic Wends. Charlemagne conquered it and gave it to the dukes of Friuli. From 973 it had mark-graves of its own, sometimes called dukes, who possessed, however, only a part of the country. On the extinction of the male line of the markgraves, part of the territory passed to the dukes of Austria, in the 18th c., and the remainder was acquired by them in the 14th. The vast majority of the inhabitants are Slavs of the Slovenian branch.

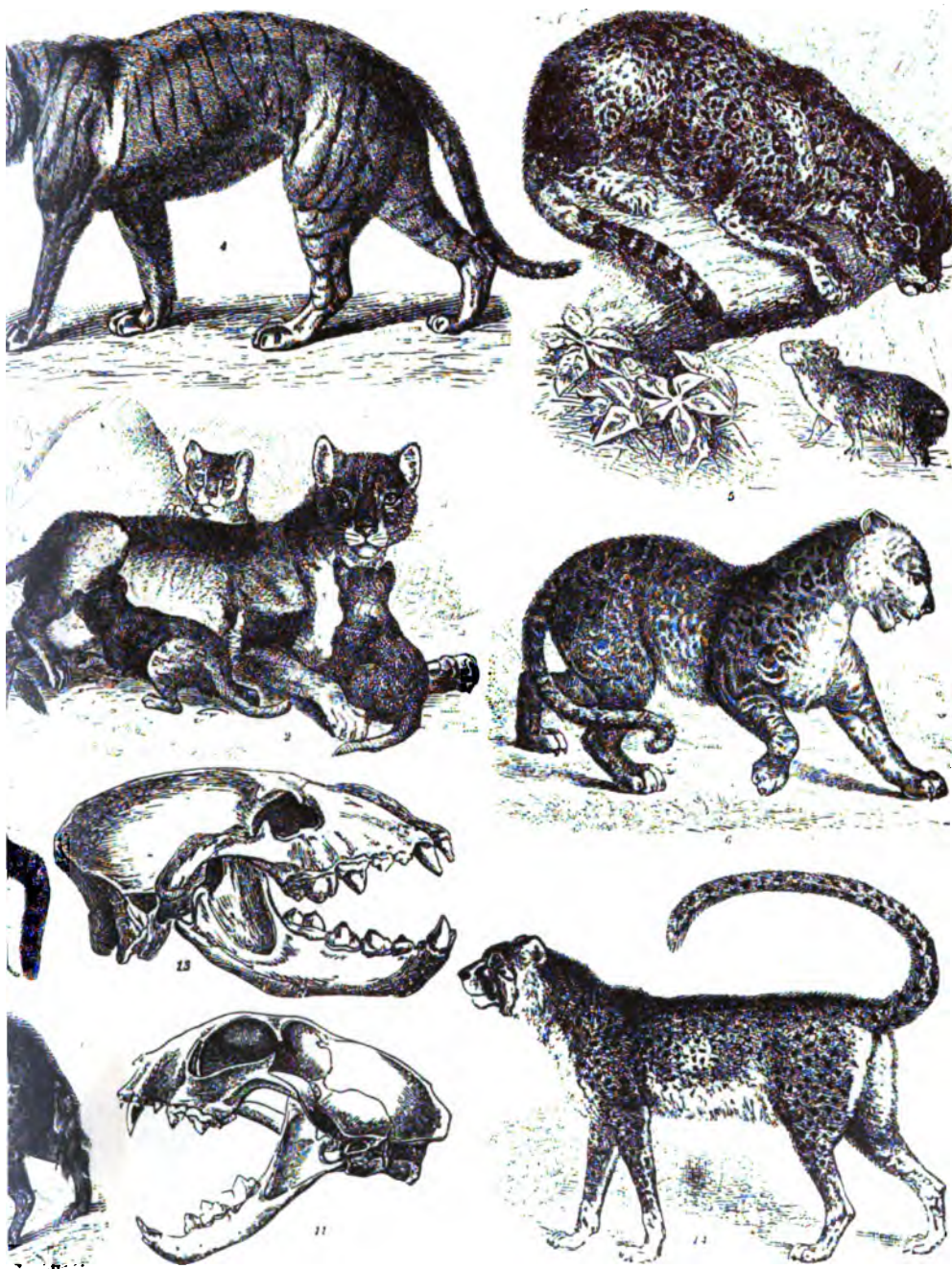
**CARNIVAL** (Ital. *carnovale*; from Lat. *carneliteramen*, a solace of the flesh), a festival in Italy, which originally began on the feast of the Epiphany, and continued to Ash-Wednesday, when the fast of Lent made an end of the preceding feasting, masquerading, and buffoonery. In later times, the C. was limited to the time of from three to eight days before Ash-Wednesday. Without doubt, the forms and customs still preserved in the celebration of the C. originated in the heathen festivals of spring-time; and they still remind us, partly of the Lupercalia and Bacchanalia of southern Europe, and partly of the Yule-feast among northern peoples. Banquets of rich meats and drinking-bouts were the chief attractions of the C. during the middle ages. Shrovetide (q. v.), or Shrove-Tuesday, called also Fasten-even or Pancake-Tuesday, was a relic of the English C., and formerly a season of extraordinary sport and feasting. The rich commenced the festive time at the feast of Epiphany, or on "Three Kings' Day;" but the middle classes restricted their days of revelry to the week immediately preceding Lent; while the poor indulged in only a few days of mad mirth. According to a papal order, the clergy were allowed to commence their bacchanalia two days before the laity. The several chief days of C. had distinct names, such as "fat" or "greasy Sunday," "blue Monday" (or "fool's consecration"), etc. The Tuesday before the beginning of Lent was especially styled C.—the *Fastnacht* of the German people. The customs of making presents of green nosegays or garlands, and planting fir-trees before houses during C., remind us of the *thyrsus* of the ancient Bacchanals, and equally of the decorations of the Yule-tide or Christmas season among northern people. The ancient custom, also, of scourging women accidentally met with during the Lupercalia (q. v.), was preserved in the mediæval observance of the carnival. In most countries, especially where Protestantism prevails, the observance of the C. is now limited to dancing and masked balls on certain days; but in Italy, as Goethe says in his charming sketch of the Roman C., it is still a general popular festive time. In former times, Venice was distinguished by the pomp and splendor of the C.; but afterwards, Rome became most prominent. In the U. S.,





CARNIVORA.—1. Lion. 2. Lioness. 3. Lion's skull. 4. Tiger. 5. Jaguar. 6. Leopard  
hyena. 13. Skull of hyena. 14. Gepard (leopard trained to hunt).





Leopard. 7. Serval. 8. Wild-cat. 9. Cat's skull. 10. Lynx. 11. Skull of lynx. 12. Spotted



The city of New Orleans is noted for the C. it holds on Shrove Tuesday, a celebration introduced by the French, and now comprising elaborately costumed processions, tableaux and balls.

**CARNIVORA**, a well-defined order of mammals, more or less efficiently adapted for predaceous life, and including most of the forms popularly known as beasts of prey. It partly corresponds with the order *feræ* defined by Linnæus, but the latter included also marsupials and insectivora. Not all animals carnivorous in diet are C. in structure, for the dasyure or Tasmanian devil is a marsupial, and the blood-sucking desmodus is a bat. Nor are all the members of the order C. in diet purely carnivorous, for the polar bears eat grass greedily, the rats are very partial to honey, and many forms eat fruits, berries, insects, mollusks, or crustaceans in a highly omnivorous manner.

*General Characters.*—The dentition of most C. is very characteristic; there are in each jaw 6 pointed cutting teeth, 2 strong, sharp recurved canines, and molar teeth often adapted for cutting. The skull is short and dense. The lower jaw works up and down in a deep transverse semi-cylindrical groove, and there are deep hollows on the sides and prominent crests on the roof of the skull for the reception and insertion of the powerful muscles which work the jaw. The toes are clawed, with more or less pointed nails, almost always well developed. As one would expect in animals with a vigorous life-experience, the convolutions of the brain and olfactory lobes are well developed. In contrast to herbivorous animals, the stomach is simple, and the cæcum or blind process of the intestine is either absent or small. The placentation is deciduate and generally zonary. Carnivorous diet, vagrant predatory habit, fierce disposition, and high intelligence are familiarly characteristic.

*Classification.*—It becomes at once necessary to distinguish 2 sub-orders: (a) the typical, terrestrial C. ( *fissipedia*), and (b) the aberrant, aquatic forms ( *pinipedia*), which may be thus contrasted.

**FISSIPEDIA.**

Terrestrial, at most partially aquatic.  
Special cutting back tooth in each jaw.  
Incisors almost always 3.  
Strong curved sharp claws.  
First and fifth digits of hind foot never longer than the others.

**PINIPEDIA.**

Aquatic, except at birth.  
Very uniform back teeth.  
Always fewer.  
Webbed feet.  
Outmost and inmost toes of hind foot predominate in length and strength.

The second sub-order, with its numerous adaptive characters, has doubtless been derived from the first, and is divided into 8 families, with about 50 species: (1) otariidæ (sea-bears), nearest the typical carnivores; (2), trichecidæ (walrus), and (3) phocidæ (seals). Some tertiary fossil forms are known, but they are not nearer the typical carnivores than those now existing.

Cuvier proposed to divide the typical carnivores into plantigrades, walking on the entire sole—e.g., bears; and digitigrades, walking on finger-tips—e.g., cats; but these physiological differences are rendered useless by the multitude of transitional links connecting them, and besides, as an accurate fact, the majority of carnivores belong to neither one form nor the other, but may be called sub-plantigrade. It is at once more accurate and useful to divide the typical carnivores into three sections, represented familiarly by bear, dog, and cat, and technically known as arctoidea, cynoidea, seluroidea. The distinctions are based on certain features in the base of the skull, but are corroborated by other more general characteristics. There are about 800 living species.

(1) The *Arctoidea*, which are least specialized, and nearest the aquatic sub-order, include the following families: (a) mustelidæ—e.g., otter (*lutra*), sea-otter (*enhydra*), skunk (*mephitis*), sand-bear (*arctonyx*), badger (*meles*, *taxidea*), ratel (*mellivora*), grison (*galictis*), marten and sable (*mustela*), stoat or ermine (*putorius*), glutton (*gulo*), etc.; (b) procyonidæ—e.g., raccoon (*procyon*), coati (*nasua*), kinkajou (*cercoleptes*); (c) ailuridæ—e.g., panda (*allurus*); (d) ursidæ—e.g., bear (*ursus*).

(2) The *Cynoidea*, occupying a medium position, include numerous forms in two series, represented by dog and fox.

(3) The *Seluroidea*, comprising the most specialized carnivores, include 4 families: (a) felidæ—e.g., cat, lion, tiger, jaguar, cheetah (*felis*); (b) viverridæ—e.g., civet (*viverra*), binturong (*arctictis*), ichneumon (*herpestes*); (c) hyenidæ—e.g., aardwolf (*proteles*) and hyena.

*Pedigree and History.*—The fossil history of C. is of great interest, for not only have some remarkable forms, like the sabre-toothed tiger (*machærodus*), (q.v.) been unearthed, but the various families are linked together, as the cats and civets, by *proviverra*, and the ancestors of at least the cats and the dogs are found in primitive generalized carnivores, such as *miacis*, *oxyæna*, and *arctocyon*. The group affords beautiful illustration of increasing and of divergent specialization, as illustrated in the passage from primitive forms to the lion, on the one hand, and the seal on the other. As to the relation of the C. to other orders of mammals, speculation is rife, but firmly based conclusions hard to find. Looking backward, some naturalists have discovered affinities with the marsupials, while others, looking forward, have with more abundant evidence regarded the primitive carnivores as ancestral to insectivora, and through them to cheiroptera. Some, again, find affinities between cetacea and carnivores, though this is vigorously denied by other



authorities. See Huxley, *Anatomy of Vertebrate Animals*; and Flower, *Osteology of Mammalia*.

**CARNIVOROUS PLANTS.** See DIONÆA; SUNDEW.

**CARNOCHAN, JOHN MURRAY**, b. Georgia, 1817; educated in Edinburgh; studied medicine and surgery with Dr. Mott of New York, beginning practice in 1847. Dr. Carnochan rapidly rose to the first rank among practicing physicians and surgeons, and acquired great celebrity for the boldness and success of his operations, such as the removal of the lower jaw; the cure of elephantiasis by ligature of the femoral artery; excision of the ulna and still preserving the arm with most of its functions; amputating the hip joint; and particularly for removing, in a case of neuralgia, the entire trunk of the second branch of the fifth pair of nerves. Dr. C. was professor of the principles and operations of surgery in the New York medical college, and health officer of the port. He published a number of important papers on medicine and surgery. D. 1887.

**CARNOT, LAZARE NICOLAS MARGUERITE**, b. May 13, 1753, at Nolay, in the department of Côte d'Or, Burgundy, gained distinction at an early period by his talents in mathematical science and military engineering. In 1791, he became a member of the legislative assembly, and, in the convention, voted for the death of Louis XVI. After taking the command of the army of the north, and gaining the victory of Wattignies, he was elected into the committee of public safety, in which he was intrusted with the chief direction of military affairs, and greatly contributed to the successes of the French army. Though he endeavored to restrict the power of Robespierre, he was accused, with others, after the reign of terror; but the charge was dismissed. In 1797, having opposed the extreme measures of Barras, his colleague in the directory, C., as a suspected royalist, was sentenced to deportation. He escaped into Germany, where he wrote his defense, which conduced to the overthrow of his colleagues in 1799. The 18th Brumaire brought him back to Paris, where he was made minister of war, 1800; and by his energy, skill, and fertility of administrative resource, helped to achieve the brilliant results of the Italian and Rhenish campaigns. He retired, however, from his office when he understood the ambitious plans of the emperor, but hastened, when he witnessed the reverses of the empire, to offer his services to Napoleon, who gave him the command of Antwerp in 1814, which he heroically defended. During the hundred days, he held office as minister of the interior; and after the second restoration, retired first to Warsaw, and next to Magdeburg, where he died, Aug. 2, 1823. Among C.'s numerous writings on mathematics and military tactics, etc., we may notice his *Essai sur les Machines en Général* (1786); *Réflexions sur la Métaphysique du Calcul Infinitésimal* (1797); and the *Géométrie de Position* (1818).—His son, LAZARE HIPPOLYTE CARNOT, b. at St. Omer, April 6, 1801, one of the leaders of the French democracy, was in early life a disciple of St. Simon, but, like others, left that school on account of the lax morals advocated by *Enfantin*—protesting against "the organization of adultery"—and devoted himself to the inculcation of a more orthodox and virtuous socialism in various periodicals. In 1847, he declared himself a republican in his brochure, *Les Radicaux et la Charte*; and, after the Feb. revolution, was appointed minister of public instruction, but not finding himself in sufficient *rapport* with his colleagues, he resigned. In 1863, he entered the corps législatif, and the national assembly in 1871. He wrote an *Exposé* of St. Simonianism and *Mémoires* of Henri Grégoire and of Barrère. D. 1888.—MARIE FRANÇOIS SADI CARNOT, president of the French republic, b. at Limoges, Aug. 11, 1837, was the oldest son of the last named. He studied at the École Polytechnique, and was by profession a civil engineer. In 1871 he was chosen to the national assembly, and was finance minister in the Brisson cabinet of 1879, as also in the Freycinet cabinet of 1887. In Dec., 1887, he was, on the resignation of Grévy, chosen president of the republic, a result largely due to the circumstance that the leading factions could not agree as to their special candidates. The president, who bore a high character for moderation and integrity, was fatally stabbed at Lyons, June 23, 1894, by an anarchist named Santo Caserio.

**CARNUNTUM**, an ancient t. in upper Pannonia, on the Danube, founded by the Celts, but at an early period a Roman post. Marcus Aurelius resided here for three years during his wars with the Marcomanni. In the 4th c. C. was destroyed by German invaders; it was afterward rebuilt, and finally destroyed in the Magyar wars of the middle ages.

**CAROB, AL'GAROA, or LOCUST-TREE**, *Ceratonia siliqua*, a tree of the natural order *leguminosæ*, suborder *casalpinieæ*, a native of the countries around the Mediterranean sea, in size and manner of growth much resembling the apple-tree, but with abruptly pinnate dark evergreen leaves, which have about two or three pair of large oval leaflets. The flowers are destitute of corolla; the fruit is a brown leathery pod, 4 to 8 in. long, a little curved, and containing a fleshy and at last spongy and mealy pulp, of an agreeable sweet taste, in which lie a number of shining brown seeds, somewhat resembling small flattened beans. The seeds are bitter and of no use, but the sweet pulp renders the pods an important article of food to the poorer classes of the countries in which the tree grows. They are very much used by the Moors and Arabs. They are also valuable as food for horses, for which they are much employed in the s. of Europe, and have of late years begun to be extensively imported into Britain, under the name of *locust beans*, which name and that of *St. John's bread* they have received in consequence of an ancient

opinion or tradition, that they are the "locusts" which formed the food of John the Baptist in the wilderness. It seems probable that they are the "husks" (*keration*) of the parable of the Prodigal son.—The Arabs make of the pulp of the C. a preserve like tamarinds, which is gently aperient.—The C. tree is too tender for the climate of Britain. Dr. Royle thinks its introduction into the n. of India would be an important addition to the resources of that country, and a valuable safeguard against famine. The produce is extremely abundant, some trees yielding as much as 800 or 900 lbs. of pods. The wood is hard, and much valued, and the bark and leaves are used for tanning.—The locust tree (q.v.) of America is quite distinct from this.

**CAROL**, a Christmas hymn that may be traced to the primitive church. It was customary to call upon such as could sing to praise God in a hymn, either out of the Scriptures or of their own invention; and it was also customary for bishops on Christmas day to make sport with their clergy, and to sing; which custom was in imitation of the *Gloria in Excelsis* of the angels. See CHRISTMAS CAROLS.

**CAR'OLAN**, or **O'CAROLAN**, TURLOGH, 1670–1738; one of the most noted of native Irish bards. When but 18 years old he became utterly blind, and thenceforward followed the profession of wandering minstrel, in which character he won great fame. The number of his compositions, to the greater part of which he fitted words, was about 200.

**CAROLINA PINK**. See SPIGELIA.

**CAROLINA, MARIA**, 1752–1814; daughter of Francis I. and Maria Theresa of Austria, and queen of Naples by her marriage with Ferdinand IV. in 1768. She had great influence with the king, leading him in 1798 to declare war against France, the consequence of which was the marching of the French upon Naples and the flight of Ferdinand and Carolina to British protection. After returning to Naples she conspired against Napoleon, and, with her husband, was again expelled. She died in Vienna before any further restoration to the throne.

**CAROLINE**, a co. in e. Maryland, on the Delaware border, intersected by branches of the Philadelphia, Wilmington, and Baltimore railroad; 815 sq. m.; pop. '90, 13,908, includ. colored. It has a level sandy surface, producing corn, oats, potatoes, etc. Co. seat, Denton.

**CAROLINE**, a co. in e. Virginia, on the Rappahannock river, and the Richmond, Fredericksburg and Potomac railroad; 515 sq. m.; pop. '90, 16,681, includ. colored. Productions, wheat, corn, oats, and tobacco. Co. seat, Bowling Green.

**CAROLINE**. See CARLINE.

**CAROLINE, AMELIA ELIZABETH**, wife of George IV. of Great Britain, was the second daughter of Charles William Ferdinand, duke of Brunswick Wolfenbüttel, and of the princess Augusta of Britain. She was born on the 17th May, 1768, and spent her youth under great restraint at her father's court. In 1795, she was married to the prince of Wales. The marriage was disagreeable to him, and although she bore him a daughter, the princess Charlotte, he separated from her immediately on her recovery from childbed; and she lived by herself in a country residence at Blackheath, the object of much sympathy, the people regarding her as the victim of her husband's love of vice. Reports to her discredit led the king, in 1808, to cause investigation to be made into her conduct, which was found to be imprudent, but not criminal. In 1814, she obtained leave to visit Brunswick, and afterwards to make a further tour. She visited the coasts of the Mediterranean, and lived for some time on the lake of Como, an Italian, by name Bergami, being all the while in her company. When her husband ascended the throne in 1820, she was offered an annuity of £50,000 sterling to renounce the title of queen, and live abroad; but she refused, and made a triumphal entry into London, whereupon the government instituted proceedings against her for adultery. Much that was very offensive was proved as to her conduct; but the manner in which she had been used by her husband, and the splendid defense of Brougham, caused such a general feeling in her favor, that the ministry were obliged to give up the divorce bill, after it had passed the house of lords. She now fully assumed the rank of royalty, but was refused coronation, and turned away from the door of Westminster Abbey on the day of the coronation of her husband. She died on 7th Aug., 1821.

**CAROLINE BOOKS**, four works drawn up at the request of Charlemagne against the decrees of the second council of Nice on the adoration of images, and contained in the *Capitularum Prolatium* of Charlemagne.

**CAROLINE ISLANDS**, or **NEW PHILIPPINES**, a widely scattered archipelago in the Pacific, n. of New Guinea and e. of the Philippines, between 8° and 11° n., and 135° and 187° e. The westernmost are known as the Pelew (q.v.) or Palau islands, and cover 190 sq. m. of land, being nearly encircled by a coral reef. The surface is well wooded, and the soil fertile, producing bread-fruit, cocoa-nuts, sugar-cane, oranges, bananas, etc., in abundance. Cattle, sheep, and hogs have been domesticated; there is a great variety of birds, and the lagoons abound with fish. The inhabitants are dark-colored, and evidently of Papuan and Malay blood. The islands, and most of the villages, form independent but co-operative republics. One of the most remarkable institutions is the "clöbbergall," a kind of union for mutual aid and defense. The women, too, have clöbbergalls of their own, and exercise much political influence. Up to the

close of the last century the people used stone instruments and weapons. Their currency consists of pieces, or piers, of ancient glass and enamel, to which they ascribe a divine origin. The population of the Caroline and Pelew islands is estimated at 36,000. They comprise between 400 and 500 islands, of about 360 sq. m. in all. Most of them are small atolls and uninhabited. They consist of many groups. The Matelotas group lies n.e. of the Pelews, and consists of three islands, thinly inhabited. Yap, or Guap, further n.e., is 10 m. long, and has a good harbor. The natives of Yap are more advanced in civilization than their neighbors; they cultivate the betel-nut with great care, build good boats, lay out regular villages, pave the streets, and build stone piers and wharves. A Spanish mission was established in 1856. The Ulea, Swede, and Lutke islands are unimportant. The Hugoleu (or Rug) group, discovered in 1824, are mountainous and wooded. They have an area of 50 square miles and a population of from 8,000 to 10,000. The Mortlack, or Young William's group consists of three islands, with a small population, of Samoan origin, who are the only idol-worshippers in all the archipelago. To the n.e. lies Ruven island, inhabited by immigrants of mixed foreign blood. The Senlavin group, comprising three islands, has a small colony of whites, and one of the islands has been the seat of an American mission since 1851. This island, called Ascension by the French, is a rendezvous for whaling vessels. In the center is a remarkable pile of ruins which seem to have belonged to a fortification. Strong's island, in the center of the Carolines proper, is a volcanic upheaval, discovered by Crozier in 1804, and is now the seat of an American mission. The eastern Carolines, otherwise the Mulgrave archipelago, comprising the Radak or Marshall group, were annexed to Germany in 1886. See POLYNESIA. The sovereignty of Spain over the C. I. was formally admitted by Germany and England, 1885. See illus., PAPUA AND CAROLINE ISLANDS, vol. XL.

**CAROLINE MATILDA**, 1751-75; sister of George III. of England; queen of Denmark, having married Christian VII. in 1768, by whom she became the mother of Frederick VI. Through the jealousy of the queen dowager and the king's step-mother, she was accused of infidelity, and the king, who had become weak-minded, if not idiotic, caused her and Struensee, her physician, to be arrested. The interference of the British minister saved the queen from death, but she was sent into Hanover, where she died of grief in the castle of Celle. See STRUENSEE.

**CARON, RENÉ ÉDOUARD**, b. Canada, 1800; educated in the Quebec seminary; admitted to the bar in 1826. He was mayor of Quebec 1827-37, and speaker of the legislative council 1843-47, and 1848-53; when he abandoned political life, and was appointed judge of the queen's bench. In 1857 he was commissioner for codifying the laws of Lower Canada, and in 1873 was appointed lieutenant-governor of Quebec. He d. in 1876.

**CAROLUS-DURAN, ÉMILE AUGUSTE**, b. Lille, France, 1838; portrait painter, pupil of Souchon. While living with the monks of Subiaco, at Rome, he painted "Evening Prayer" (in the Salon of 1863); received first medal for his *L'Assassiné*, 1866; was made chevalier of the legion of honor, 1889, and elected to the order of Léopold. He will be chiefly remembered as a portrait painter. His style is so subtle, vigorous, and original, that the critics find it difficult to classify him.

**CAROTID ARTERY**. The great artery which on each side distributes blood to the different parts of the head, appears to have derived its name either from Gr. *kara*, the head, or, more probably, from Gr. *karos*, sleep, there being an old idea, which the researches of Dr. Alexander Fleming have shown to be correct, that there was some connection between deep sleep and compression of these vessels.

Each C. A. consists of the primitive or common carotid, which, at the upper margin of the larynx or organ of voice, separates into two great divisions, of nearly equal size—the external and the internal carotid. The external carotid supplies the larynx, tongue, face, and scalp with blood; its principal branches being the superior thyroid, the lingual, the facial, the occipital, the posterior aural, the internal maxillary, and the temporal. The last-named artery is occasionally opened by the surgeon in preference to a vein, as, for example, in certain cases of cerebral apoplexy. The internal carotid enters the cavity of the cranium through a somewhat tortuous canal in the temporal bone, and after perforating the dura mater, or fibrous membrane of the brain, separates into the anterior and middle cerebral arteries, which are the principal arteries of the brain; while in its course through the dura mater, it gives off the ophthalmic artery, which subdivides into several small branches that supply the eye and surrounding parts. See CIRCULATION.

*Surgery*.—Wounds of the carotid trunks are generally from stabs. Suicides have a vague desire to cut them, but rarely cut sufficiently deep by the side of the windpipe. Of course, should either vessel be wounded, death results almost immediately. Punctured wounds, however, may not be immediately fatal; they may heal, or a false aneurism (q. v.) may result. Such an occurrence happened about twenty years ago in Scotland. A young man was stabbed close to the root of the neck; a pulsating tumor formed, which rapidly increased, and would undoubtedly have burst before long, had not prof. Syme of Edinburgh cut into it, and, by an operation requiring extraordinary courage and dexterity, tied the common C. A. above and below the part stabbed; thereby saving

not only the life of the patient, but that of the man who had inflicted the wound, and who was then in prison awaiting his trial.

Sir Astley Cooper was the first to tie the common carotid for spontaneous aneurism, in Nov., 1805; and since then, the operation has been successfully performed in a number of cases. Owing to the numerous interchange of branches between vessels of both sides of the head, cutting off the supply of blood through one carotid is seldom followed by affections of the brain. Such have, however, occurred in a few instances; but Dr. Mussey of America tied both carotids within twelve days of each other without any such result.

The common carotid in the horse is the termination of the right arteria innominata. It is a large vessel, about an inch long, which emerges from the chest below the windpipe, and divides into the *right* and *left* carotids. These bend upward, having the windpipe between them, gradually inclining inwards at the upper part, where each divides into external and internal carotid, and a large anastomosing branch arising from between these two.

**CAROUGE**, a t. of Switzerland, in the canton and about one m. s. of Geneva, on the left bank of the Arve. It is beautifully situated, regularly built, and surrounded by villas, orchards, and meadows. It has a handsome Roman Catholic and a Protestant church. There are manufactures of thread, clay pipes, leather, watches, and pottery. There is a bridge across the Arve connecting the town with Geneva. In 1780 the king of Sardinia, as ruler of Savoy, tried to set it up as the industrial rival of Geneva, but failed. Pop. about 5700.

**CAROUS** (a corruption, probably, of the French *carrosse*), a pivoted platform or gallery used in ancient ships of war. It was raised by means of tackles, and swung over the deck of another vessel, thus serving as a boarding bridge.

**CARP**, *Cyprinus carpio*, a fish of the family *Cyprinidae* (q.v.), of which, indeed, it may be regarded as the type, a native of the central countries of Europe, and corresponding latitudes in Asia, but on account of its value as an article of food, long naturalized in many countries in which it is not indigenous. No fish, indeed, except its congener the goldfish, has been so much transported by man from one place to another; and this has been the more easily and successfully accomplished, that the C. can subsist longer than most fishes out of the water, if only kept moist. The C. is said not to be originally a native of England, but the statements sometimes made as to the time of its introduction are untrustworthy; it certainly existed in England before the 16th century. It is mentioned in the famous Boke of St. Albans, in 1486, by Dame Juliana Berners, as a "dayntous fyshe, but scarce." The C. spawns in May, and is out of condition until July. It does not succeed so well in Scotland, of which country it is certainly not a native, as in the s. of England; and in northern countries generally, it neither increases so rapidly in size, nor exhibits so great fecundity, as in more congenial climates. Its fecundity, in favorable circumstances, is prodigious; more than 700,000 eggs have been found in the ovaries of a single C. of moderate size. The C. is rather an inhabitant of lakes and ponds than of rivers, in which, if it is found, it shows a preference for the stillest parts. It feeds chiefly on aquatic plants, and may be fattened on lettuces and similar soft vegetables, for which its teeth are remarkably adapted, being few, mostly large, flat, and situated on the pharynx very far back in the mouth; worms, mollusks, and insects, however, form part of its food. It deposits its spawn on weeds. It is said to live to a great age, even 150 or 200 years; its scales, "like the productions of the cuticle in some other animals, becoming gray and white with age." It is known to attain the weight of 3 lbs. when six years old. A C. of 18 or 19 lbs. weight is deemed of extraordinary size in England, but one of 70 lbs. weight, and nearly 9 ft. long, was taken near Frankfort-on-the-Oder, and 80 or 40 lbs. is not an unusual size in some of the German lakes. In Austria and Prussia, many lakes and ponds are let at a high rent for the C. which they contain.—Of the other species of the genus *cyprinus*, as now restricted, which are found in Britain, none belong to the section having barbules at the angles of the mouth. See CRUCIAN, GIBEL, and GOLDFISH.

To the angler, the C. is not a very valuable fish, as he is by no means a free biter. When hooked, however, he runs strongly, and fights with considerable determination and cunning. In still water, the best means of fishing for C. is with a very light quill-float. A small piece of dead rush will answer the purpose equally well, or better. The float should be fixed on the line so that the bait may be *upon* the bottom, and if that be clear of weeds (the angler must take care that it is so), the C. will easily see and pick up the bait. It is advisable, however, in fishing for C. to use two rods, and the float to one of these should be so placed that the bait may be just *off* the bottom. The former tackle should be baited with well-scoured red worms, gentles, or grubs of some sort; the latter with a green pea, boiled wheat, or paste. The hooks should be of No. 8 size, and tolerably stout in the wire, and the gut perfectly round and good, and as fine as is consistent with the size of the fish angled for. In using green peas or wheat, boil until the skin cracks. Very small potatoes of the size of a bean have been known to attract good carp. The best paste is bread worked up with a little brandy or gin. Gentles, wasp grubs, flies, and other insects, worms, or caterpillars, may all, at times, take carp. When a C. bites, he nibbles at the bait for

some seconds before he takes it, and often takes off the tail of the worm, or strips the hook completely. But it is quite useless to strike until the float disappears entirely.

**CARPÆDA**, a dance in ancient Thessaly; a pantomime represented by two men, one a robber and the other a plowman, in which there was a contest for the possession of the plowman's oxen, which are finally captured by the robber. All the action was rhythmical, and performed much like a pantomime of the present day.

**CARPA'THIAN MOUNTAINS**, the mountains which inclose Hungary and Transylvania on the n., e., and s. in a great semicircle (whose concavity is towards the s.w.), extending over a space of 800 m. from Presburg on the Danube to Orsova on the same river, between lat. 44° 30' to 49° 40' n., long. 17° to 26° east. The C. M. form part of the great mountain system of central Europe, separated from the mountains of Silesia and Moravia by the valley of the March, and from the Alps and Mt. Hæmus by the valley of the Danube. Almost the whole of the C. M. lie within the Austrian dominions. They form two great masses, one in Hungary to the n.w., and one in Transylvania to the s.e., with ranges of lower and wooded mountains between. The highest group of the Hungarian Carpathians is that of *Tatra* or the *Carpat*, in the very n. of Hungary, a majestic mass of granite mountains, exhibiting much grandeur in its naked precipices, and in some of its peaks rising to the height of more than 8,000 ft., the Lomnitz peak being 8,133 ft. high. On the northern declivity of the Eisthal peak exists the only glacier in the Carpathians. The Tatra group is penetrated by no valleys, but only by wild ravines, and is separated from the rest of the range by deep depressions. There is a great difference of climate between its southern and northern sides. These higher mountains yield few minerals, but the lower Carpathians of Hungary, which stretch around them in groups and ranges, abound in minerals of various kinds. The mines of Schemnitz (q.v.) are of great celebrity. Many of the Hungarian mountains are of limestone. The mountains of Transylvania are mostly of primitive rocks. On the eastern and southern borders, they reach the height of 9,000 ft. and upwards. Mt. Butschetje, the culminating peak, has an elevation of 9,528 ft. above the sea. The C. M. are generally clothed with wood to a height of more than 4,000 ft.—in some parts, forests are found at 5,500 ft.—and with steep precipices, narrow ravines, extinct craters, and cones of volcanic origin, they exhibit scenes of grandeur rarely exceeded. The lower parts of the mountains are beautifully clothed with vineyards, walnut groves, etc., above which ascend forests of cherry, beech, and pine. The ranges which connect the high mountains of Hungary with those of Transylvania are in great part composed of sandstone, have an unfruitful soil, and comparatively little population or cultivation.

**CARPATHOI.** See SCARPANTO.

**CARPEAUX**, JEAN BAPTISTE, 1827-75; a French sculptor, whose more conspicuous works are "The Fisher Boy," "Ugolino and his Children," "Neapolitan Fisherman," "Girl with a Shell," "France enlightening the World," and protecting Agriculture and Science," and the noted group, "La Danse," on the façade of the Paris opera-house.

**CARPEL** (Gr. *karpos*, fruit), in botany, a modified leaf forming the whole or part of the pistil of a flower. The number of ovaries and stigmas in the pistil depends on the number of carpels of which it is composed, but sometimes several are so intimately united that they appear as one. It is the upper surface of the leaf which forms the inner surface of the carpel. At its margins, the ovules are developed, like the buds formed on true leaves of some kinds of plants. The fruit, as well as the pistil, may therefore be said to be composed of one or more carpels.

**CARPENTA'RIA**, GULF OF, a broad and deep indentation of the n. coast of Australia, stretching from 11° to 17° 30' s. lat., and from 136° to 142° e. longitude. It is said to have been named from Carpenter, a Dutchman, who discovered and partly explored it in 1627. The gulf of C. contains many islands. The shores of the mainland are generally low; and in the rainy season the floods materially freshen the sea.

**CARPENTER**, FRANCIS BICKNELL, b. 1830; a portrait painter. His "Emancipation Proclamation" (1864), is in the National Capitol at Washington, and his "International Arbitration" (1891), was presented to Queen Victoria. He published *Six Months in the White House* (1866).

**CARPENTER**, LANT, LL.D., 1780-1840; an English Unitarian minister, successor of Dr. Kenrick at Exeter; afterwards in charge of a church in Bristol. He was much interested in the religious instruction of children, and established several Sunday-schools. Among his works are *An Introduction to the Geography of the New Testament*; *Unitarianism the Doctrine of the Gospel*; *Examination of the Charges against Unitarianism*; and *Harmony of the Gospels*. See *Life*, by R. L. Carpenter (1842).

**CARPENTER**, MARY, daughter of the Rev. Dr. Lant Carpenter, of Bristol, and sister of Dr. William Carpenter (b. 1807, d. 1877). She took an active part in the movement for the reformation of neglected children, and besides advocating their cause in her writings, she founded several reformatories for girls, one of which, the Redhedge Reformatory, she superintended. In the prosecution of her philanthropic labors she visited India three times, and in 1871 instituted the National Indian Association, whose journal

she edited. Besides her reformatory writings, she published *Our Convicts* (1864), a book which drew public attention to the treatment of young criminals; *The Last Days of the Rajah Rammohun Roy*; and *Six Months in India*.

**CARPENTER, MATTHEW HALE**, b. Vt., 1824; studied law with Rufus Choate; and in 1848 settled in Wisconsin, from which state he was returned as U. S. senator in 1868, and was re-elected in 1879. C. was an able lawyer and a brilliant debater. He d. 1881.

**CARPENTER, WILLIAM BENJAMIN**, M.D., LL.D., F.R.S., F.L.S., F.G.S.; 1813-85; one of the most distinguished physiologists and writers on physiology of the day. Soon after his graduation in Edinburgh in 1839, he published his *Principles of General and Comparative Physiology*, afterwards divided into *The Principles of Comparative Physiology*, and *The Principles of General Physiology*. These works, together with *The Principles of Human Physiology*, which originally appeared in 1846, and reached a fourth edition in 1853, and *The Principles of Mental Physiology* (Lond. 1874), form a perfect cyclopædia of biological science. Dr. C. likewise published *A Manual of Physiology*; *The Microscope, its Revelations and its Uses*; a prize essay upon *The Use and Abuse of Alcoholic Liquors*; and numerous memoirs on various departments of physiology, microscopical anatomy, and natural history, in the *Philosophical Transactions*, etc. His most important original researches are *On the Structure of Shells*; *On the Development of Purpura Lapillus*; and *On the Structure, Functions, and General History of the Foraminifera*. For several years he edited *The British and Foreign Medico-Chirurgical Review*, and he was one of the editors of *The Natural History Review*. In 1856, he became registrar of the university of London. He took a chief part in the government expeditions sent out in 1868-69-70 for deep-sea exploration in the N. Atlantic; and in consequence he contributed largely to the discussion of the vexed question of ocean circulation in the journal of the royal geographical society and other periodicals. In the art. ATLANTIC in the *Ency. Brit.*, 9th ed., his views will be found summarized. He advocated the doctrine of a vertical circulation sustained by opposition of temperature only, independent of and distinct from the horizontal currents produced by winds; see GULF STREAM. This doctrine was first advanced by Prof. Lenz of St. Petersburg in 1845; but Dr. C. was ignorant of this, when the deep-sea observations, begun in 1868, led him to an identical theory. In 1879 he resigned the registrarship of the univ. of London. In 1882 he visited the U. S.

**CARPENTER, WILLIAM HENRY**, b. at Utica, N. Y., 1853; entered the class of 1878 at Cornell University, but in the fall of the same year matriculated at the University of Leipzig for the study of Germanic philology and literature, paying special attention to the Scandinavian side of these subjects. He visited Denmark and Iceland, remaining in the latter country during the winter of 1879-80, returned to Leipzig in 1880 and soon afterward went to Freiburg, in Baden, where he took the degree of Doctor of Philosophy in 1881, returning in the same year to America. He was Fellow at Johns Hopkins University, 1881-83, and taught afterwards at Cornell and Columbia Universities, becoming professor of Germanic philology in the latter institution in 1895 and the head of the Germanic department upon the death of Prof. H. H. Boyesen in Oct. of that year. He has published *Grundriss der Neuisländischen Grammatik* (Leipzig, 1881); *Nikolas drapa Halle Prests*, an Icelandic poem (Halle, 1881), and has contributed numerous articles to magazines and journals at home and abroad. He has also written many articles on German, Dutch and Scandinavian subjects for prominent cyclopædias.

**CARPENTER BEE**, a name given to those bees that excavate their nests in wood. One of these, *xylocopa violacea*, has been already noticed, and its nest briefly described, in the article Bee (q.v.).

**CARPENTRAS**, a t. of France, in the department of Vaucluse, is situated on the left bank of the Auzon, about 15 m. n.e. of Avignon. This town was known to the Romans as *Carpentoracte*, and, among other remains, a triumphal arch attests their former presence here. It also contains a Gothic cathedral. For a time it was the residence of the papal court, Clement V. having removed to the town about 1313. Pop. '91, 9778.

**CARPENTRY**, is the art of framing timber for architectural and other purposes. Technically, the term is restricted to the framing of heavy work, such as the roofs, floorings, partitions, and all the wood-work concerned in maintaining the stability of an edifice, while the minor and ornamental fittings are called joinery; but popularly the workman who does either kind of work is called a carpenter.

The preliminary preparation of timber is the work of the sawyer, who, by the saw-mill or pit-saw, divides the trunks of trees into planks, etc.; these are further divided by the carpenter, who uses hand-saws of various kinds, according to the work. For dividing wood into separate pieces in the direction of the fiber, the *ripping-saw* is used; for cross cutting, or sawing thin pieces in the direction of their length, the common *hand-saw* or the finer-toothed *panel-saw*; for making an incision of a given depth, and for cutting small pieces across the fiber, the *tenon-saw*, the *ash-saw*, or *dovetail-saw* is used. These are thin saws, stiffened by a strong piece of metal at the back to prevent crippling. When a curved cut is to be made, a very narrow saw without a back, called a *compass-saw* or a *keyhole-saw*, is used. The general name for these is *turning-saws*; they have their plates thin and narrow towards the bottom, and each succeeding tooth finer, and the teeth are not bent on contrary sides of the plate for clearing, as in broad saws.

The surface of wood is smoothed by planing. According to the work, different kinds of planes are used: the *jack-plane*, which is large and rough, for taking away the rough of the saw; the *trying-plane*, for bringing the surface perfectly level and true, or the *long-plane* for the same purpose, where the work is of great length, as for the joining edges of long boards to be glued together. The *smoothing-plane*, which is much smaller than these, gives the smooth finished surface. The *spoke-shave*, a sort of plane with a double handle, is used for paring and smoothing rounded work.

Ornamental moldings are cut by means of molding-planes, which have their cutting edges curved to the required pattern. A good stock of these is one of the most expensive items of the tool-chest.

The paring of wood, and the cutting of rectangular or prismatic cavities, notches, etc., are done by means of *chisels*. Those for cutting across the fiber are called *firmers* or *paring-chisels*; those for cutting deep and narrow cavities, *mortise-chisels*, which are made very thick and narrow, and fitted in the handles with a strong flange, to bear heavy blows with the mallet. Chisels for paring concave surfaces are called *gouges*. For boring holes, *brad-awls*, *gimlets*, *centerbits*, and *gouges* are used—the two latter are fixed in a *stock* or revolving handle, and are used for large holes. When it is required to ascertain if an angle be square, or of any given inclination, the *square*, or the *bevel* set to the required angle, is applied to test the work as it proceeds. When parallel edges are required, the *marking gauge* is used to draw the line to be worked to. When a simple straight line is required for working to, a piece of string is chalked, then stretched tightly over the wood and lifted in the middle, when, by its recoil, it strikes the wood and leaves a straight chalked line. The *straight-edge*, a strip of wood with one of its edges perfectly straight, is applied to detect superficial irregularities. The operation of planing the edge of a board straight is called *shooting*, and such edges are said to be *shot*. When the joiner requires to ascertain whether the surface of a piece of wood is all in one plane, he takes two slips of wood with edges perfectly straight and parallel, and of equal width; these slips, called *winding-sticks*, are placed edge upwards, one at each end, across the board, and the workman looks in the longitudinal direction of the board over the upper edges, and if the two edges be not in the same plane, the board is planed down at the elevated parts until it is *out of wind*. For setting work level, a spirit-level, set in a wooden frame, or a plumb-level is used. For further description of the tools alluded to above, and in the rest of this article, see the special articles.

When two pieces of timber have to be united at their ends, as in lengthening the beams for roofing, partitions, the masts and keels of ships, etc., the operation is called *scarfing*, and the joint a *scarf*. The methods of scarfing are very numerous; those figured below will serve to illustrate the principal.

The following are the principal rules for scarfing as stated by Tredgold.

The length of the scarf should be, if bolts are not used—in oak, ash, or elm, six times the depth of the beam; in fir, 12 times the depth of the beam. If bolts and indents are combined, the length of the scarf should be—in oak, ash, or elm, twice the depth of the beam; in fir, four times the depth. In scarfing beams to resist transverse strains, straps driven on tight are better than bolts. The sum of the areas of the bolts should not be less than one fifth the area of the beam, when a longitudinal strain is to be borne. No joint should be used in which shrinking or expansion can tend to tear the timbers. No joint can be made so strong as the timber itself. When two pieces of timber are connected so that the joint runs parallel with the fibers of both, it is called a *longitudinal joint*; but when the place of the joint is at right angles to the fibers of both, an *abutting joint*. A very short tenon is called a *stub tenon*. When a second minor tenon is made projecting from the principal tenon, it is called a *tusk tenon*.

For lighter joiner's work, other methods of framing are used, and adapted to the work—to boards generally instead of beams; thus, for example, the mortise and tenon joint, made oblong instead of square, is used in framing doors, shutters, drawing-boards, or any other kind of extended superficial work liable to warping. An outside frame or skeleton is made with a panel or panels in the middle, and each piece of the frame has the grain at right angles to the piece into which it is mortised, in order that they shall eventually correct the warping.

Dovetailing is extensively used for connecting boards at right or other angles, as in making boxes, drawers, etc. Common dovetailing is usually glued. Nails or pins and glue are used with the miter and other notched joints.

Boards may be united at their edges to form an extended surface, as a flat plank partition, etc., either by simple gluing of the shot edges, by a *rebate*, or by a plowed groove and a corresponding projection. The rebate is cut by means of a rebating plane; that in the figure is combined with a bead, the usual joint for wooden partitions. The groove, a sort of extended mortise, is cut by a plane with a projecting iron called the *plow*.

In all cases where glue is used in joints, it should be applied to both surfaces, which should be rubbed and pressed together until nearly all the glue is forced out, then kept pressed by a cramp or weights. White lead is used for outside joints.

Special departments of this subject, such as roofs, staircases, etc., will be treated under their respective heads.

**CARPET-BAGGER**, a term of contempt applied by the people of the southern United States to a man who came from any other part of the union to live in the south, or to transact business there after the close of the civil war. The term has been extended so as to designate any person in any part of the country who has no fixed residence. In the unsettled condition of the southern states after the civil war, they furnished an inviting field for adventurers and demagogues, who gave some ground for the stigma which has largely attached to the name of carpet-bagger.

**CARPET BUG** (*Anthrenus Scrophulariæ*), an insect long known in Europe, and described by Linnaeus, but comparatively recently introduced into the United States. It appears to have been first noticed in carpets in Buffalo, N. Y., in 1872. Public attention was called to its ravages by newspaper articles published in New York in the summer of 1874. As early as 1850, however, another variety of the species (*anthrenus lepidus*) was seen on flowers in California. The larva is the form in which it comes under the notice of housekeepers and in which it commits its ravages. The larva, including its terminal bunch of hairs, is about three-eighths of an inch in length. It is marked by rings banded with dark brown, its head has a bunch of dark brown hairs, and long brown bristly hairs pointing backward project from its sides. The terminal bunch of hairs is often as long as the perfect larva. The larva casts its skin several times during the course of its growth. In autumn, the pupa is formed within the split skin of the larva. The perfect insect or beetle is formed in the winter, and in May is often found on the windows of infested rooms. The beetle is small, its average length being one eighth and its breadth one-twelfth of an inch. It is black in color, marked along the back with a central red line, and with red and white spots on the wing covers. The larvæ are active in the summer months. Their special home is in the borders of carpets, near the walls. Here they eat large irregular holes, or else cut a straight line, following the joinings of the floor. A favorite place of gathering is round the tacks with which the carpet is fastened. The larvæ, if left unchecked, overrun houses, devouring woolen fabrics especially. Various means have been tried to check this pest. Soft tallow has been poured into the crevices of floors and tallowed paper laid beneath the borders of carpets. Kerosene oil and benzine are useful. Fresh and pure Dalmatian insect powder has been of service. Carpets left unnailed at the borders are less exposed to injury, while they offer ready means for the discovery of the first attack.

**CARPETS.** Woven C., such as are now so common in this country, were first used in the east, where the custom of sitting cross-legged on the floor still renders them especially useful. Our rude forefathers covered the floors of their houses with rushes, hair, or straw; and in Norwegian farm-houses, where so many of our ancient customs still exist, the floor of the best room is commonly strewn with juniper-twigs. The first step towards a woven carpet was made by plaiting rushes to form a matting.

The principal varieties of C. now in use are the Turkey, the Axminster, the Brussels, the Wilton, the Venetian, the Dutch, the Kidderminster or Scotch, Whytock's tapestry and velvet pile, and the printed felt carpet.

The real Turkey carpet is made in one piece; those manufactured for the orientals are usually too small for use in this country. The patterns consist merely of curved and angular strips, of variegated but dark and unobtrusive colors. The warp is of strong linen or cotton, to which bunches or tufts of colored worsted are tied according to the pattern, a drawing of which is placed before the weaver to copy. The surface is afterwards shorn level. Rugs are made in a similar manner; the colored worsteds are tied very rapidly by young girls.

The Axminster carpet is merely the English-made Turkey carpet, formerly manufactured as above at Axminster, in Devonshire. They are usually made to order, and of the size required for the room; from the tedious nature of the process of manufacture, they are very expensive.

Templeton's patent Axminster carpet is a very beautiful fabric, very much resembling that from which it derives its name, but it is wrought on the chenille principle.

The Brussels carpet is a mixture of linen and worsted, but, like the Turkey carpet, the worsted only is shown on the upper surface. The basis or cloth is a coarse linen fabric, and between the upper and under threads of the weft, several (usually five) worsted threads of different colors are firmly bound in. The pattern is produced by drawing to the surface, between each reticulation of the cloth basis, a portion of the worsted thread of the color required at that spot to produce the pattern; these updrawn portions are formed into loops, by being turned over wires, which are afterwards withdrawn, and the loops thus left standing above the basis form the figured surface of the carpet. The machinery and processes by which this arrangement is produced are rather complex, and require to be seen to be fully understood.

The Wilton carpet is made like the Brussels, but the wire has a groove in its upper surface, and instead of being drawn out, it is liberated by passing a sharp knife through the worsted loop into this groove, and thus making a velvet pile surface instead of the looped thread.

The Venetian carpet is produced in a common loom, and the pattern is all in the warp, which alone is visible, as it incloses the weft between its upper and under surfaces. The patterns are generally checks or stripes; the latter are chiefly used for stair carpets.



The *Dutch carpet* is a coarser and cheaper variety of plain Venetian, sometimes made wholly of hemp, or of a mixture of coarse wool and cow-hair.

The *Kidderminster* or *Scotch carpet* has usually a worsted warp and woolen weft, and the pattern is made by the combination of the colors of each. Three-ply C. of this kind are made especially in Kilmarnock. This is the most durable of the moderate-priced C.: the patterns are not so brilliant as those of the Brussels or the tapestry, but, being ingrained and woolen throughout, they retain their character until worn through. This, and the three immediately preceding descriptions of carpet, exhibit their patterns nearly similar on both sides, and are therefore reversible.

*Whitlock's tapestry and velvet pile carpet*, as it is now frequently called, is becoming very extensively used as a cheap substitute for Brussels and Wilton, which it is made to resemble very closely in the brilliancy and variety of pattern. The manufacture of this carpet is very curious and ingenious. Instead of five colored yarns, only one of which is drawn to the surface at any one place, while the other four remain buried between the upper and under threads of the cloth basis, a single colored yarn is used, and the variety of color produced by dyeing it of various colors at intervals of its length. The yarn is coiled upon a drum, and printed by means of rollers in such a manner that when the threads that encompass the roller shall be uncoiled and laid in line side by side, they shall present an elongated printing of the pattern, so that a rose, for example, the outline of which should be nearly circular, will be an oval, with length equal to four times its breadth. When, however the thread is looped over the wire, 4 in. of yarn being used for an inch of the carpet pattern, this elongation is exactly compensated, and the rose appears in its proper proportions. The machinery required for this is, of course, much simpler than that for the Brussels, only one yarn having to be looped, and that always in the same manner.

In the United States among the great centres of carpet manufacture are Philadelphia; Amsterdam and Yonkers, N. Y.; Hartford, Conn.; Lowell, Clinton, and Worcester, Mass.; and Baltimore, Md. As early at 1836, Brussels carpets were made by hand in Philadelphia, Auburn, N. Y., prison, and a few other places; and to the invention of the power-loom by Erastus B. Bigelow (q.v.) is chiefly due the rapid progress of the industry. In 1886 it was estimated that there were in the U. S. 1197 Brussels looms, producing annually, if all running, goods valued at \$17,955,000, and 1510 tapestry looms, which under the same conditions would yield a product worth \$13,590,000.

**CARPINI**, JOHANNES DE PLANO, a celebrated Franciscan monk, b. in Capitanata, Naples, about 1210; was one of the six friars selected by pope Innocent IV. to proceed to the court of the emperor of the Mongols, whose warlike advances in 1246 threw Christendom into consternation, in order to pacify the terrible nomadic warriors, and, if possible, convert them to Christianity. The mission, accomplished under dreadful hardships, though without results so far as its main objects were concerned, was nevertheless far from unfruitful. Prior to this, the most monstrous fables had prevailed regarding the Tartars; and C.'s narrative, which gave a truthful and striking picture of their numbers, character, and civilization, was the first to bring these myths into discredit. In this book he also argued, with great good sense, for a union amongst Christian princes, as the only means of resisting those fierce hordes in their progress westward. As a book of travels, its accuracy has been attested by modern travelers. Hakluyt copied most of this work, at second-hand, into his first volume of *Navigations and Discoveries*.

**CARPOCRATES**, or **CARPOCRAS**, flourished under Hadrian (130 A.D.) at Alexandria, where he founded the Gnostic sect of Carpocratians. According to him, the essence of true religion consisted in the union of the soul with the Monas or highest God, by means of contemplation, which elevated it above the superstitions of the popular faith, and liberated it from the necessity of submitting to the common laws of society. He only is to be reckoned wise who attains to this. Among those who have done so, are Jesus, Pythagoras, Plato, and Aristotle. The cosmogony of C. was of the usual Gnostic character, the central peculiarity of which was the belief that the worlds were created by angels. C. also held the doctrine of the transmigration of souls. His followers existed down to the 6th century. Whether or not they were guilty of the abominations ascribed to them, is more than we can positively affirm.

**CAR'POLITES**, a generic term applied to fossil fruits, which, in the present state of our knowledge, it is impossible to refer more precisely to their place in the vegetable kingdom. Of 100 species described, 70 belong to the carboniferous system.

**CARP'PUS**, **CARPAL BONES**. See **HAND**, **FOOT**, **SKELETON**.

**CARPZOV**, a Saxon family descended from Simon Carpzov, burgomaster of Brandenburg about the middle of the 16th century. He left two sons—Benedict and Simon. **BENEDICT**, 1565–1624, was a jurist and professor of law at Wittenberg; and in 1602, chancellor to Sophia, electress of Saxony. He died at Wittenberg, leaving five sons. **JOACHIM**, the eldest son of the burgomaster, reached a high position in the Danish army. **BENEDICT**, the second of the five, 1595–1666, was a professor at Leipzig, ordinary of the faculty of jurists at the same university, and in 1653, privy counselor at Dresden. He published several works which had much influence in the administration of justice. His later years were spent in religious study. **August**, 1612–83, his brother and the fourth son of the first Benedict, was distinguished as a diplomatist, was chancellor of the consistory at Coburg, and at the time of his death a privy counselor at Gotha. He was a man of

piety, and the author of several devotional works. JOHANN BENEDICT, 1607-57, fifth son of the first Benedict, was professor of theology at Leipsic, and the author of a system of theology and other works of that nature. He also left five sons, all of whom obtained conspicuous reputation. One of the five was JOHANN GOTLOB, 1679-1767, who became an eminent theologian and professor of oriental languages at Leipsic. He wrote an introduction to the canonical books of the Old Testament, and a *Critica Sacra Veteris Testamenti*. JOHANN BENEDICT, grandson of the first Johann Benedict, 1720-1803, was professor of philosophy at Leipsic, and professor of poetry and Greek at Helmstadt, and professor of theology. He wrote many philological works, and ended his life as an abbot.

**CARQUINEZ**, or **KARQUENAS**, a strait in California, between Suisun and San Pablo bays, 7 m. long, navigable for steamboats, and for large vessels as far as Benicia.

**CARR**, **DABNEY**, 1744-73; a brother-in-law of Thomas Jefferson, and an eloquent member of the Virginia colonial legislature.

**CARR**, **SIR ROBERT**, d. Rhode Island, 1667; one of the English commissioners to New England, appointed by Charles II., the others being Nichols, Maverick, and Cartwright. After the capture of New Amsterdam (New York) from the Dutch in 1664 by Nichols, C. compelled the Dutch and Swedes on the Delaware to submit to a capitulation. He then went with the other commissioners to Boston, where they administered the government.

**CARRACA**, **LA**, a t. of Andalusia, Spain, one of the chief naval arsenals of the kingdom, is situated 4 m. e.s.e. of Cadiz. It has been completely isolated from the mainland by artificial means; and so low is its situation, that it was necessary to erect the buildings on piles. It is defended by forts, and is altogether very complete as an arsenal.

**CARRACCI**. See **BOLOGNESE SCHOOL**.

**CARRAGEEN**, often incorrectly called C. moss, or **IRISH MOSS**, a sea-weed (natural order, *algæ*; sub-order, *ceramiceæ*), or rather several species of sea-weed, now used to a considerable extent both medicinally and as an article of food. The name C. is originally Irish; and the use of these sea-weeds appears to have been entirely confined to the peasantry of the coasts of Ireland, until, about 30 years since, they were recommended to general notice, and their medicinal virtues proclaimed by Mr. Todhunter, of Dublin. They are, however, found on the rocky sea-shores of most parts of Europe, and of the eastern shores of North America. The species which principally constitutes the C. of commerce is *chondrus crispus*, of which the varieties are remarkably numerous. It is 2 to 12 in. long, branched by repeated forking, cartilaginous, flexible, reddish-brown. *C. mamillatus* also frequently occurs. C., after being collected, is washed, bleached by exposure to the sun, dried, and packed up for the market. Its composition is as follows:

Vegetable jelly (carrageenin).....	79.1
Mucus.....	9.5
Two resins.....	0.7
Ash.....	2.0
Fiber and water.....	8.7

100.0

When treated for ten minutes with cold water, in the proportion of half an ounce of C. to three pints of water, and then boiled and strained, it yields, with or without spices, a very pleasant drink. With a larger proportion of C., a thickish liquid or *mucilage* is obtained; and on boiling down this decoction, and cooling, a stiff *jelly* is procured. Milk may be employed, instead of water, in the preparation of the various decoctions; and with the stronger one, along with sugar and spices, when thrown into a mold, a kind of *blanc mange* is obtained. C. is valued on account of its emollient and demulcent properties, and is likely to be found useful in most of those cases in which iodine might be exhibited; but its value seems to depend not a little on its being at once nutritious, a pleasant article of food, and easy of digestion. See **GELATINE**. It has been much recommended in pulmonary consumption. In some parts of Ireland, C. boiled with water (mucilage) is used instead of size for mixing with the more common colors in house-painting.

**CARRANZA**, **BARTOLEMÉ DE**, 1508-76; a Spanish theologian of the Dominican order, a man of great learning and eloquence. Charles V. sent him as envoy to the council of Trent, where he maintained that it was the duty of priests to reside in their benefices. He accompanied the prince, afterwards Philip II., to England, where he went to settle the marriage with Mary. In England, Carranza became queen Mary's confessor, and worked hard for the re-establishment of Roman Catholicism. Philip made him archbishop of Toledo, an appointment that aroused such jealousy that Carranza was denounced as a heretic. He was kept in prison eight years, thence taken to Rome and kept in prison, being at last compelled to abjure opinions which he had never held. He was then degraded from his office and sent to a convent, where he died seven days afterwards. He was afterwards honored as a saint by the Spanish people.

III.—16

**CARRAPA'TO**, a species of tick (q.v.) of the genus *ixodes*, which infests dry bushy places in the interior of Brazil, hanging in clusters of many hundreds on very slender twigs, and ready to attach itself to any quadruped or man that passes, instantly burying its beak in the skin, from which it cannot be detached without considerable force. Horses and oxen suffer very much from the attacks of the C., of which in dry seasons the numbers are so great that whole herds of cattle are destroyed by the exhaustion which they produce.

**CARRA'RA**, a t. of northern Italy, 60 m. s.w. of Modena. It is situated on the Avenza, near its mouth in the Mediterranean, and is surrounded by the marble hills which have made its celebrity. Many of the principal buildings are wholly or partially constructed of the inferior kinds of white marble. There are upwards of 30 marble quarries in the vicinity of the town, but not more than 6 or 7 furnish the marble used for statuary. Extensive works, fitted up with English machinery for sawing the marble, have been established near the town, in which are several shops for the sale of marble ornaments. Many foreign artists have set up their studios here, in order to save the expense which the export of the marble in its rough state entails. C. has a fine collegiate church of the 13th and 15th centuries, with some good sculptures, an academy of fine arts, and a population of about 25,000. The quarries have been worked for more than 2000 years.

The famous **CARRARA MARBLE** is a white saccharine limestone, which derives its value to the sculptor from its texture and purity. It was formerly supposed to belong to the primitive rocks, but is now known to be a limestone of the oolitic period, highly altered by plutonic action.

**CARREL**, NICOLAS ARMAND, a French publicist and republican leader, was b. at Rouen in 1800, and was educated in the military school of St. Cyr. After serving for some years in the army, he went to Paris, and devoted his attention to political and historical studies. In 1830, in connection with Thiers and Mignet, he became editor of the *National*, the most spirited and able of the journals opposed to the government of Charles X. C.'s colleagues being employed by the new government, he was left to conduct the *National* himself, which he did with a spirit and a freedom such as had not been witnessed in France for a long time—which on more than one occasion checked the arbitrary power government attempted to exercise, and gained for him the high admiration and esteem of the popular party. Government prosecutions of course followed his outspokenness, and heavy fines were decreed against him; but these were paid by public subscription, and each conviction only made his journal more famous. C., however, dreaded revolution as much as he hated despotism, and had no sympathy with many of those who looked up to him as a leader. Provoked into a duel with Emile de Girardin, by an attack on his personal character, C. was mortally wounded, and died July 24, 1836. His funeral was attended by many of the most distinguished men in France.

**CARREÑO**, THERESA, pianist, b. in Caraccas, Venezuela, Dec. 22. 1853. She studied under her father, Manuel Antonio Carreño, and in 1862 appeared at a concert in New York, where she attracted the attention of Gottschalk, who taught her his own compositions. She went to Europe in 1866, and was married to Emile Sauret, the violinist, Giovanni Tagliapietra, the baritone, and Eugen d'Albert. She gave concerts in many parts of America, and met with great success. She published compositions for the pianoforte.

**CARR'E'RA**, RAFAEL, 1814-65; a Guatemalan of Indian and negro blood, who in 1837 led a band of insurgents and the next year captured the city of Guatemala. In 1839, he again held the city by force. In 1847, he was elected president of the republic, and in 1851, re-elected for life. In 1863, he made war on San Salvador, captured the capital, and expelled the president. Though almost a savage, and without education, his government on the whole was mild and reasonable.

**CARRIACOU'**, one of the West India islands, 20 m. n.e. of Grenada; 7 m. long by 3 wide. Cotton is the chief production.

**CARRIAGE**. See COACH.

**CARRIAGE DOG**, or DALMATIAN DOG, a variety of dog resembling the modern pointer in its shape and size, but less sagacious and keen in scent. It is often kept in stables, becomes attached to the horses, and may often be seen running after or under carriages. It also is called coach-dog. Its proper color is white with small black spots regularly distributed over its body, ears, and tail. The hair is short, and the tail has no brush. The disposition of the dog is inoffensive. The name Dalmatian is somewhat misleading, for the probability is that the breed was brought from India.

**CARRICAL**, or KARIKAL, a French port within the limits of Tanjore, a district of the presidency of Madras. It stands in lat. 10° 55' n., and long. 79° 53' e., on the estuary of a small branch of the Cauvery, a tributary of the bay of Bengal. C. is accessible from the sea only after the periodical rains, and then only for coasting craft. The town and territory contain 68 sq.m., and about 50,000 inhabitants. The settlement, originally ceded to France by a native grant in 1759, and subsequently subdued by the British, was restored in 1814, on condition of being neither fortified nor garrisoned.

**CARRICKFERGUS**, a seaport t. of Ireland, is situated on the lough of Belfast, about 10 m. distant from the town of that name. Though locally within the co. of Antrim, it forms a co. of itself. C. extends nearly a mile along the north-western shore of the lough. Its chief feature is its castle, a fine picturesque object, supposed to have been erected by De Courcy in the 12th century. It is situated on a rock about 80 ft. high, projecting boldly into the sea, by which it is surrounded on three sides. The ballium or keep is 90 ft. in height. From the top of the keep a splendid view is obtained, extending, in a clear atmosphere, to the Mourne mountains and the Scotch coast. The castle contains a barrack, bomb-proof magazine, and ordnance store-rooms; and for many years, 22 pieces of ordnance, 12-pounders, were mounted on the works. A total change has, however, been made in the defense of the castle, and cannon of a very large caliber are now mounted, in order to command the entrance of the lough. In 1575, a wall 16 ft. high and 7 thick, with 7 bastions, to surround the town, was commenced, and completed in the year 1608; a considerable portion of the wall is still standing, and one of the 4 entrance-gates. On the 14th June, 1690, king William III. landed here with his army, 12 days before the battle of the Boyne. The rock on which the king stepped on landing is at the end of the quay, projecting from it, and still forming the landing-place. In 1760, commodore Thurot captured the castle, but on the approach of troops from Belfast, was forced to abandon it. The parish church, said to have been founded in the year 1164, on the site of a pagan temple, is a fine old building, dedicated to St. Nicholas. There are several other churches and chapels in the town., and several good day and Sunday schools in connection with the religious bodies, and a fine model school has been erected by the national board. There is a literary and scientific society, with reading-room, library, and museum. The fishery of the bay, which is famous for oysters of an unusual size, employs a good number of the inhabitants. There are spinning-mills, bleaching establishments, and manufactures of linen and cotton fabrics. A market is held every Monday and Saturday, and a fair twice a year. Pop. '91, about 8900. Till 1885 it was a parliamentary borough. There are several barrows or tumuli in the vicinity. C. is connected by railway with Belfast, Portrush, and Larne. A few years since, a shaft was opened by the marquis of Downshire, in the hope of finding coal—without success; but salt of a superior quality, and in great abundance, was found. A company has been formed, and are working the mine. The length and breadth of the co. are nearly equal—about 5 statute miles.

**CARRICK-ON-SUIR**, a t. of Tipperary, situated, as its name implies, on the Suir, which is navigable at this point, 12 m. e. of Clonmel, in the midst of very fine scenery. Pop. about 6000. C. was formerly celebrated for its woolen manufacture, which has recently been considerably revived, and there are also linen and flax factories. It exports much agricultural produce. In the vicinity are good slate quarries. C. became a place of note soon after the Norman conquest. There are the remains of a castle built in 1300, on the site of an old priory of the Knights of St. John of Jerusalem.

**CARRICK'S FORD**, on Cheat river in West Virginia, where, July 13, 1861, a confederate force under Gen. R. B. Garnett was routed by a federal force under Gen. T. A. Morris, and of the confederates several were killed.

**CARRIER, JEAN BAPTISTE**, one of the most infamous and blood-thirsty members of the French national convention, was b. at the village of Yolai, near Aurillac, in Haut-Auvergne, in 1756. Entering the national convention in 1792, he took an active part in the formation of the revolutionary tribunal, voted for the death of the king, demanded the arrest of the duke of Orleans, and assisted in the overthrow of the Girondists. At Nantes, whither he was sent on a mission against the moderates, in Oct., 1793, he found ample means for indulging his insatiable thirst for human blood. The utter defeat of the Vendéans had filled the prisons with captives, and C. proposed and carried a resolution for murdering the unhappy prisoners *en masse*. Accordingly, on Nov. 15, he compelled 94 priests to embark in a vessel, under pretense of deportation, and during the night drowned the whole of them, by having the ship scuttled. Another of these *noyades*, as they were called, in which 138 persons were sacrificed, took place soon after, and they were repeated to the number of 25, their perpetrators facetiously terming them "vertical deportations." Other cruelties C. committed here. Men and women were tied together feet and hands, and thrown into the Loire; and this was called *mariage republicain* (republican marriage). With such recklessness were these murders committed, that, in one instance, a number of foreign war-prisoners were drowned by mistake. The water of the Loire was so poisoned by corpses, that its use for drinking and cooking was prohibited. Five hundred political prisoners were shot, as in a battue, on the bridge near Nantes. Even Robespierre was offended by these enormities, and recalled C., who boldly justified his own conduct before the convention. The fall of Robespierre was, however, soon followed by outcries against Carrier; judgment was decreed against him, and he perished under the guillotine, Dec. 16, 1794—dying with the protestation that, in all his cruelties, he had acted according to orders, and as a true republican patriot.

**CARRIERE', MORITZ**, b. 1817; a German scholar, professor of philosophy at Giessen and Munich, and author of many works on philosophy, religion, æsthetics, poetry, etc.

He was a pronounced liberal, going so far as to advocate the conversion of the cathedral at Cologne into a free church. He was also an art critic of high rank. He d. in 1895.

**CARRIER PIGEON**, a variety of the domestic pigeon (q. v.), remarkable for the degree in which it possesses the instinct and power of returning from a distance to its accustomed home; and which has been, therefore, much employed to convey letters from one place to another. In eastern countries, where such messengers are most frequently employed, it is the practice to bathe the pigeon's feet in vinegar to keep them cool, and to prevent it from alighting in quest of water, by which the letter might sustain injury. Pigeons intended for this use, must be brought from the place to which they are to return, within a short period, not exceeding a fortnight of their being let loose, and at a time when they have young in their nest; the remarkable fecundity of the C. P. affording particular facilities for its employment in this way. The bird is also kept in the dark and without food, for at least eight hours before being let loose. The instinct by which it is guided, like most other instincts, has received no sufficient explanation. That it recognizes objects by sight, and so directs its course, is nothing more than a conjecture, and as such, is only very partially supported by the fact of the great power of vision which these birds, in common with so many others, are known to possess, and by that of the C. P., on being let loose, immediately rising spirally to a great height in the air, as if to obtain opportunity for the exercise of this power. The C. P. has probably been more used in the Turkish dominions than in any other part of the world; and during the siege of Paris in 1871, it safely conveyed many important messages. Its rate of flight is not less than 30 m. an hour, and it has been known to pass over great distances still more rapidly. The variety generally described as the C. P. (*columba tabellaria* of Linnæus, *C. Turcia* of some authors, but not generally regarded by naturalists as a distinct species), is of remarkably large size, about 15 in. in length from the point of the bill to the extremity of the tail, and has the cere very large and carunculated, the eyes surrounded with a broad circle of naked red skin, and the wings reaching nearly to the extremity of the tail. There is, however, a smaller variety, which is said to be superior to it, and which has not the carunculated cere, nor the broad circle around the eye. Carrier pigeons are trained by being conveyed, when young, to short distances of a few miles from home and then let loose, the distance being gradually increased; and this training is said to render them much more secure as messengers. After the Franco-German war, nearly every continental nation of Europe organized regular "military pigeon systems." By the use of microscopic photography as many as 30,000 despatches can be sent on thin films or pellicles of collodion by the agency of a single bird. In 1886, a pigeon owned in Germantown, Pa., flew 451 miles in nine hours and eighteen minutes.

**CARRIERS**, a class of persons who, in various forms, by land and sea, undertake the carrying of goods, particularly articles of commerce. In all countries aspiring to commercial intercourse, the **CARRYING TRADE**, as it is called, has been less or more developed. The method of carrying in Arabia, Persia, and some other countries in the east has, till the present time, been chiefly by means of the camel, an animal of great value, on account of its strength, patience, and power of endurance. See **CAMEL**. In England and Scotland, previous to general use of the wheel-carriages, goods were carried on pack-horses, as is still practiced in some parts of Spain with mules. See **PACK-HORSE**, also **MULE**. After the pack-horse came the one-horse cart and the four-wheeled wagon, as engines of land-conveyance. Carrying with one-horse carts settled down as a universal practice in Scotland, where it is still conducted in all districts not traversed by railways. The Scotch C., winding their way by roads over hill and dale, at the rate of about 20 m. a day, have ever been a respectable and useful body of men, exceedingly trustworthy, and moderate in their charges. In connection with Edinburgh, Glasgow, and other centers of traffic, they travel to and from provincial towns for the most part once a week on certain days, so that their arrival at any particular place may be reckoned on with great exactness. In England, the employing of wagons for carrying goods in connection with the metropolis and provincial towns is now of old date. These carriers' wagons, greatly limited in their range by the introduction of canals and railways, are still to be seen in some of the rural districts. A wagon of this kind is provided with four broad huge wheels; and being a heavy and clumsy engine of conveyance, is drawn by four horses, though, when roads were bad in old times, six horses were not unusual. The driver ordinarily rode on a pony alongside the vehicle; now he more frequently walks, carrying a long whip. The wagon has a hooped top with movable covering; and the hinder part has always been left vacant for the use of passengers, who are necessarily huddled together on straw. Traveling in the "tail of the wagon" is now entirely gone, or nearly so; but with all its rude inconveniences, it was common till past the middle of the 18th c., and has afforded scope for some of the most grotesque descriptions of Fielding and Smollett. The tedious process of carriage by these wagons largely increased the prices of goods, and retarded the growth of commerce. The first modification in the carrying trade took place by means of inland navigation, to which reference has already been made. See **CANAL**. The conveyance of cotton goods from Lancashire, of earthenware from Staffordshire, of metal goods from Birmingham, of salt from Cheshire, etc., became much more easy than before, owing to the large quantity which could be packed in each barge, and to the great amount of work done by each horse. The chief owners of the old wagons became, in time, the chief owners of the

canal-boats; they paid rates or tolls to the canal companies. The celebrated English firm of Pickford & Co. has been for many generations, and still is, at the head of the goods carrying trade.

When railways were established, a great struggle ensued; the owners of the road-wagons and canal barges had a formidable competition. They wisely accommodated themselves to a state of things which they could not prevent, and added the trade of railway goods C. to their former business. Three systems were tried: 1. The company purchased road-wagons or vans, collected goods at the various towns, conveyed them by railway, and then distributed them at their several destinations. 2. The company confined their attention to the mere conveyance on their railway, leaving the collection and delivery to the ordinary carriers. 3. The company combined both systems, conveying on the railway everything that offered, and competing with the C. for the road-traffic. During the greater portion of the period in which the railway system has been in operation, the second of the above three plans has been adopted more extensively than either of the others. Taking as examples the greatest railway company and the greatest carrying firm, Messrs. Pickford had warehouses or depots at all the principal towns where the London and North-western railway had stations. The merchants and manufacturers were customers, not to the company, but to the firm, for the conveyance of merchandise. Messrs. Pickford employed their own wagons and horses, clerks and porters, in collecting and delivering goods, and paid to the company so much per ton for the conveyance along the railway, the toll varying according to the nature of the goods and the distance run. There was seldom any quarrels or disputes under this system. The carrier was responsible to the customer from first to last for the safety of the merchandise; and he had a claim against the company for any injury while the merchandise was on the railway. Under the third system, disputes were much more frequent. The companies were bound by law to carry goods for all persons at certain tolls; but when they became road C. as well, they competed with the ordinary C. in a way which the latter could barely contend against. The Great Western railway has been unfavourably distinguished for jealousies and law-suits between the company and the carriers.

At the present time, the tendency is for the companies to take the responsibility of the whole conveyance, the C. acting as their agents, if willing so to do, or else endeavoring to maintain a fair competition. One of the greatest of the companies, the Midland, have in this way become C. on their own account, in order to obtain a share of the profit which accrues from road-traffic. The goods-vans traversing the streets of the metropolis, and other great towns, are now more frequently inscribed with the names of railway companies than with those of private carriers.

The goods-depots of the several railways are scenes of great activity during the night; for it is then that the arrival-trains are mostly unpacked, and the departure-trains mostly made up. During the day, vans are collecting goods from manufactories and warehouses; these goods are sorted at the depots, and are, when evening comes on, distributed among different trains, according to the part of the country to which they are to be conveyed. On the other hand, goods-trains arriving during the evening and night are unpacked, the goods classified according to districts, and sent out for delivery by road-vans on the following day.

The four-horse broad-wheel wagons, as already said, have almost disappeared from English roads; vans of lighter construction sufficing to convey merchandise from and to the various railway stations. Canals still command a trade, but it is chiefly in coal, stone, lime, ores, slate, bricks, and other articles very bulky in proportion to their value. The conveyance of manufactured goods has, for the most part, passed over to the railways.

Under C. are included carters and porters, who offer themselves for hire, to carry goods from one part of a city to another. Whether the same be the case with hackney-coachmen, is more doubtful; though, from the extent to which they are now employed in the transport of luggage, there seems no sound reason for an exemption in their case. Wharfingers and warehousemen are liable only under the special contracts into which they may have entered, or in accordance with mercantile usage. The introduction of the parcel post system (1888) has in some respects revolutionized the carrying trade in Great Britain.

**CARRIERS, COMMON.** In the U. S., common carriers are such as transport for hire for all persons indifferently. They operate both on land and water, and embrace stage-coach proprietors, railway and steamboat companies, truckmen, teamsters, express companies, etc., including owners and masters of every kind of vessel or water-craft who come before the public as the carriers of freight of any kind for whomsoever may choose to employ them, for either a long or a short voyage. Common C. are responsible for loss or damage during transportation from whatever cause, "except the acts of God, or of the public enemy." The act of God means only such inevitable accidents as occur without man's agency. The carrier is not responsible for losses occurring from natural causes, such as fermentation, evaporation, freezing, the ordinary decay of perishable articles, or the natural wear in the course of transportation, provided he exercises reasonable care to have such dangers as little as practicable. C. who undertake general business are bound to carry all matter that offers, under liability of legal action if they refuse without just excuse; but any carrier may restrict his business to certain goods, in which case he is not bound to accept things out of his line. A carrier may

require payment of freight in advance; and he is entitled to a lien upon the goods for his freight and for what he advances to other carriers. But all common-law responsibility may be qualified by special contracts. The bill of lading, or receipt for the goods, is an acknowledgment of the carrier's responsibility, and is presumed to name exceptions from responsibility if any there be. Railway companies, steamboat owners, and other C. who allow express companies to carry parcels and packages on their cars, boats, or other vehicles, are liable as common C. to the owners of the goods for loss or damage without regard to the contract between them and such express carriers. Railways, steamers, etc., carrying passengers, although not liable for injury to passengers without the C.'s fault, are responsible for the baggage of such passengers entrusted to them as common C., and the responsibility continues until the delivery of the baggage to the owner, or to his order. The baggage-check is the same as a bill of lading for goods, and is evidence of the responsibility assumed. Jewelry and a watch in a trunk are considered baggage, but money, beyond a reasonable amount for expenses, is not so considered. The responsibility of C. begins upon the delivery of the goods for immediate transportation. A delivery at the usual place of receiving freight, or to those employed by the company in the usual course of business, is sufficient. But where C. have a house at which they receive goods that are not to be forwarded until further order or a later time, such C. are in the mean time responsible only as depositaries; and where goods are received as by wharfingers, or warehousemen, or forwarders, and not as C., liabilities are incurred only for ordinary negligence. The responsibility of the carrier terminates when, after the arrival of the goods at their destination, a sufficient time has elapsed for the owner to receive them in business hours. After that the carrier may store them, and is responsible only for ordinary care. The agents of corporations which are common C., such as railway and steamboat companies, bind their principals to the full extent of the business entrusted to their control, whether they follow their instructions or not; nor will it excuse the company to show that the agents acted willfully in disregard of instructions. The carrier has an insurable interest in the goods both in regard to fire and marine disaster, except such as result from inevitable accident, such as fire by lightning-stroke. If a particular time is set for the delivery of goods, damages may be recovered for exceeding that time. The carrier is liable upon general principles where the goods are delivered through his default, to the extent of their value at the place of destination; and this includes the profits of the adventure. If the goods are only damaged, or not delivered in time, the owner is bound to receive them. He will be entitled to damages, but he cannot repudiate the goods and recover for the total loss.

**CARRIERS OF PASSENGERS.** (See **CARRIERS.**) Persons who carry passengers are not held responsible as insurers of the safety of their freight as carriers of goods are held. But they are held to the highest degree of watchfulness and care in all the conduct of their business. So far as human foresight and prudence can secure the passenger from harm, there is a right to demand it of all who assume the transportation of persons. It is a practice to print on passes or free tickets a notice that such a passenger assumes the risk of personal injury, but the courts have again and again decided that this in no degree lessens the carrier's liability, holding even that the transporting party was as much responsible for a non-paying as for a paying passenger. Passenger-carriers are responsible for the baggage of their passengers, and for the safety of parcels entrusted to them or their agents. Many decisions of American courts touch various points in the case of passengers, but all sustain the principle that if anything more could have been done by the carrier to insure the safety of his passengers, and injury occur in consequence of the omission, he is liable. Passenger-carriers are not responsible where the injury occurs through the negligence of the passenger; but when there is intentional wrong on the part of the carrier, the injured party may recover notwithstanding his negligence. And so also, where the carrier's negligence contributed only remotely to the injury and the passenger's culpable want of care was its immediate cause, a recovery may still be had. Passengers leaping from a conveyance in consequence of any just sense of peril may recover for injury. Carriers are bound to carry for the whole route for which they stipulate, and according to their public notices and the general customs of their business; but they are not bound to carry persons disorderly in conduct, or those having contagious diseases, or who are in any way dangerous or offensive to other passengers. The carrier is liable for damages if he fail to deliver the passenger in a reasonable time, or according to the published schedule. The sale of through tickets for a route operated by several successive companies of carriers having no partnership connection, renders each company liable for injuries to passengers occurring only in the part of the route which pertains to it severally. One decision in case of the death of a passenger was that the jury are to estimate damages for the death as they would for an injury to health, by the probable financial accumulations of the deceased had he survived, or not been injured through the culpable negligence of the carrier; therefore he or his estate is entitled to recover not only the damages sustained up to the time of trial, but all prospective damages likely to accrue from the injury. Passengers must conform to the rules of the road or company with regard to purchasing, showing, and giving up tickets, and in respect to trains and cars. But it has been held that when one purchased a ticket indorsed "good for this trip only," and was

unexpectedly detained, he could lawfully demand transportation by another train, even on the next day. Railway companies may exclude merchandise and articles known as "express" matter from the passenger cars. When an accident occurs to a train, or a stage-coach is overturned, the fact is considered *prima facie* evidence of fault on the part of the company or its agents. With regard to steam and other vessels, very strict rules are enacted by governments for the safety of passengers and property, regulating the number of passengers, the amount of provisions, the navigating of the ship, pilotage, etc.

**CARRINGTON, HENRY BEEBEE**, was born at Wallingford, Conn., in 1824. He was graduated at Yale college, in 1845, and later studied at the Yale college law school. He became professor in New Haven collegiate institute, and commenced the practice of law at Columbus, Ohio, in 1848. In 1857, while on the staff of Governor Chase, he helped to organize the state militia; and at the outbreak of the civil war he was made colonel of the 18th U. S. Infantry, and soon after, brigadier-general of volunteers. After the close of the war, he served in the west till 1868, and in 1869 he was made professor of military science in Wabash college, Indiana. He wrote *Absaraka, the Home of the Crows*, and a *History of the Battles of the American Revolution*.

**CARRION CROW.** See CROW, VULTURE.

**CARRION FLOWERS**, a name which, on account of their smell resembling that of putrid meat, has been given to the flowers of many species of *stapelia*. The genus *stapelia* belongs to the natural order *asclepiadeae*, and is remarkable for the excessive development of the cellular tissue of the stem and reduction of that of the leaves, resulting in a general aspect like that of the *cactus* family. The species are natives of the cape of Good Hope. The flowers are often large, and not devoid of beauty, but the carrion stench is very strong.

**CARROLL**, a co. in n. w. Arkansas, on the Missouri border, and King and White rivers; 659 sq. m.; pop. '90, 17,288, incl. colored. Surface varied and soil generally fertile. There are quarries of excellent yellow marble. Co. seat, Berryville.

**CARROLL**, a co. in w. Georgia, on the Alabama border, and the Chattahoochee and Tallapoosa rivers; 549 sq. m.; pop. '90, 22,901, incl. colored. The surface is mostly mountainous; but the soil is generally fertile, producing corn, wheat, cotton, etc. One or two gold-mines have been profitably worked. Co. seat, Carrollton.

**CARROLL**, a co. in n. w. Illinois, on the Mississippi river, and crossed by the Chicago, Milwaukee and St. Paul railroad; 440 sq. m.; pop. '90, 18,320. The surface is uneven, occupied by prairie and forest, and the main products are cereals, butter, and wool. Co. seat, Mt. Carroll.

**CARROLL**, a co. in n. w. Indiana, on the Wabash river, traversed by the Wabash and the Louisville, New Albany and Chicago railroads; 370 sq. m.; pop. '90, 20,021. It has a diversified and well-timbered surface, and productive soil, agriculture being the chief business. Co. seat, Delphi.

**CARROLL**, a co. in central Iowa on the Chicago and Northwestern railroad, drained by the North and Middle Raccoon rivers; 576 sq. m.; pop. '90, 18,828. The climate is good and the soil fertile. Co. seat, Carroll.

**CARROLL**, a co. in n. Kentucky, on the Ohio and Kentucky rivers, and Louisville and Nashville railroad; 165 sq. m.; pop. '90, 9266, incl. colored. It has a calcareous soil, with abundance of limestone. Productions chiefly agricultural. Co. seat, Carrollton.

**CARROLL**, a co. in n. Maryland, on the Pennsylvania border and the Patapsco and Monocacy rivers, reached by the Baltimore and Ohio, and crossed by the Western Maryland railroad; 426 sq. m.; pop. '90, 32,376, incl. colored. It has a hilly surface, and rather thin but well-cultivated soil; its productions are wheat, corn, butter, tobacco, etc. Co. seat, Westminster.

**CARROLL**, a co. in w. Mississippi, on the Yalabusha, Yazoo, and Big Black rivers, and crossed by the Southern railroad; 615 sq. m.; pop. '90, 18,773, incl. colored. The surface is level, and the soil is remarkably fertile; chief productions, corn and cotton. Co. seat, Carrollton.

**CARROLL**, a co. in n. w. Missouri, between the Missouri and Grand rivers, traversed by the Wabash, the Burlington Route, and the Atchison, Topeka, and Santa Fé railroads; 690 sq. m.; pop. '90, 25,742, incl. colored. It has an uneven surface, in many parts covered with black walnut and oak forests; its soil is generally productive. Chief business, agriculture. Co. seat, Carrollton.

**CARROLL**, a co. in n. e. New Hampshire, on the Maine border and Winipiseogee lake, reached by branches of the Boston and Maine railroad. The surface is mostly mountainous; productions chiefly agricultural. Area, 907 sq. m.; pop. '90, 18,124. Co. seat, Ossipee.

**CARROLL**, a co. in e. Ohio, traversed by the Tuscarawas branch of the Cleveland, Canton, and Southern, and the Pennsylvania Co.'s railroads; 401 sq. m.; pop. '90, 17,566.



It is hilly, but well-watered and fertile. Iron and coal are found. The chief productions are grain, hay, butter, and wool. Co. seat, Carrollton.

**CARBOLL**, a co. in n. Tennessee, on the Big Sandy and Obion rivers, and the Louisville and Memphis, and the Nashville, Chattanooga, and St. Louis railroads; 600 sq. m.; pop. '90, 23,630, incl. colored. It is level and fertile, with forests of black walnut, hickory, maple, and oak. Chief productions, corn, wheat, cotton and butter. Co. seat, Huntington.

**CARBOLL**, a co. in s.w. Virginia, on the North Carolina border, drained by the Kanawha river; 450 sq.m.; pop. '90, 15,497, incl. colored. The surface is rough, but well adapted to grazing. Copper, iron, and lead are found. The Grayson sulphur springs are much visited. Productions chiefly agricultural. Co. seat, Hillsville.

**CARBOLL, CHARLES, OF CARROLLTON**, b. Md., Sept. 20, 1737; d. Nov. 14, 1833, aged 95 years; the last survivor of the fifty signers of the declaration of American independence. He was educated in the Jesuit colleges of St. Omer and Rheims; studied law at Bourges, Paris, and London, returning to America in 1764. He inherited the last and the largest of the old manorial estates of Maryland, a property estimated in 1775 at \$2,000,000, and he was then considered the wealthiest private citizen in the colonies. In 1775, he was chosen a member of the "committee of observation" at Annapolis, and in the same year sent to the provincial convention. In 1776, he was one of the commissioners sent to persuade the Canadians to join in the revolt against England. Returning to Maryland, he was prominent in bringing the colonial delegates to agree upon union for independence; and July 4, 1776, he was sent to congress, where, Aug. 2, he signed the declaration. At the time of signing, a delegate, alluding to Carroll's great wealth, remarked, "There goes a few millions; but there are many Charles Carrolls, and the British will not know which one it is;" whereupon Carroll immediately added after his name of *Carrollton*, an addition that was ever afterward respected. In congress, he was one of the board of war. About the close of 1776, he was one of the committee that drafted the Maryland constitution, and was chosen to the senate of that state. In 1777, he was again sent to congress, and in subsequent years was repeatedly elected to the state legislature. In 1789, he was United States senator; in 1799, one of the Maryland and Virginia boundary commission. July 4, 1821, but four of the signers of the declaration were living: Carroll, William Floyd of New York, and ex-presidents Adams and Jefferson. Floyd died in the next month, and Adams and Jefferson both died July 4, 1826, leaving Carroll the sole survivor. His last public act was the laying of the corner-stone of the Baltimore and Ohio railroad, July 4, 1828, when in his 90th year. Carroll's grand daughter, Miss Caton (d. 1853), was the Marchioness of Wellesley.

**CARBOLL, HENRY KING, LL.D.**, b. Dennistown, N. J., 1848; became an editor of *The Independent*, and agent in charge of religious statistics of the census of 1890; published *The Religious Forces of the United States* (1893), etc.

**CARBOLL, JOHN, D.D., LL.D.** 1735-1815; cousin of Charles Carroll, of Carrollton; an American Roman Catholic prelate, educated in Europe, and for a time professor at Bruges. Returning to America, he was selected, with his cousin and Dr. Franklin, to go to Canada to urge the people to join the colonies in their effort for freedom. After the revolution, C. was appointed vicar-general, and in 1789, was promoted to bishop, being the first bishop of the Roman Catholic church in the United States. A short time before his death he was made archbishop.

**CARBOLL, JOHN LEE**, b. Md., 1830; grandson of Charles Carroll, of Carrollton; educated at Georgetown coll., D. C., Emmetsburg, Md., and Harvard law school; was U. S. commissioner in New York, 1859; elected to Md. senate 1867; re-elected, 1871; gov. of Md., 1875, entering upon his duties on the 100th anniversary of the signing of the Declaration of Independence by his grandfather.

**CARBOLLTON**, a city and co. seat of Greene co., Ill., 34 m. n.w. of Alton, on the Chicago and Alton and other roads. Its trade is in lumber, agricultural products and coal; pop. '90, 2258.

**CARRON**, a village in Stirlingshire, Scotland, on the right bank of the Carron Water, 8 m. e.n.e. of Falkirk. It is celebrated for its ironworks, which are among the largest of the kind in Britain. The works were established in 1760; and are carried on by a company, who employ a great number of men.

**CARRONADES** are short iron guns, invented by Mr. Gascoigne, and named after the Carron iron works in Scotland, where they were first made. They are lighter than ordinary guns, and have a chamber for powder, like mortars. They were made standard navy guns in 1779, to be carried on the poop, forecabin, and upper works. Being manageable by a smaller number of hands than guns, and being very useful in close engagements, they were held in much favor during the great war: the seamen called them "smashers." A 68-pounder carronade weighed not much more than half as much as the 42-pounder gun in use in 1779. They range from 68-pounders down to 6-pounders. The denominations, weights, lengths, caliber, etc., of the chief varieties of carronade are noticed under **ORDNANCE**.

**CARRON OIL**. See **BURNS**.

**CARROT**, *Daucus*, a genus of plants of the natural order *umbellifera*. They are mostly natives of the countries surrounding the Mediterranean sea. The common C. (*D. carota*) is a biennial plant, common in Britain and most parts of Europe, also in the Caucasus; and is universally cultivated not only in Europe and the European colonies, but in China, Cochinchina, etc., for the sake of its root. The root of the wild plant is slender, woody, and of a very strong flavor; that of the cultivated variety is much thicker and more fleshy, much milder in its flavor and qualities, generally red, but sometimes orange or yellowish white. The sub-varieties in cultivation are also distinguished by their form—some being longer and more tapering than others—by their size, and by the duration of their growth; the *early* kinds being also comparatively small, and almost exclusively cultivated in gardens for culinary use, whilst the larger and *late* kinds are often also grown in fields, for feeding cattle. The field cultivation of the C. is carried on to a much greater extent in some parts of France, Germany, and Belgium, than in Britain; but it is increasing in Britain. The C. appears to have been cultivated at an early period in Flanders and Germany, and to have been introduced into the gardens of England in the beginning of the 16th century. In the reign of Charles I., ladies wore C. leaves as an ornament instead of feathers; and the beauty of the leaves is still occasionally acknowledged by placing a root, or the upper portion of one, in water, that it may throw out young leaves to adorn apartments in winter. The C. prefers a light and rather sandy soil, and often succeeds very well on a peat soil. It is very liable to the attacks of the larva of the crane fly (q.v.), by which the greater part of a crop is sometimes destroyed when the young roots are about the thickness of a quill; on which account, in gardens where there is particular reason to apprehend danger from this enemy, it is the practice to make a number of successive sowings, some of which may probably escape. As an article of food, C. contains a large amount of what are called heat-producing compounds, with a small proportion of flesh-forming matter. It consists essentially of starch, sugar, and albumen, along with a volatile oil, which communicates a flavor to many dyspeptics very unpleasant. The following is the composition of dried carrot:

Starch and sugar.....	98.71
Albumen.....	4.85
Red neutral substance (carotin).....	0.94
Fixed and volatile oils.....	1.00
Ash.....	0.60

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100.00

C. is easy of digestion, and gently laxative. Boiled C. is used as a poultice for foul ulcers and other sores, and as a vermifuge. Grated C. forms an agreeable cooling but also stimulant application. A sirup is prepared from carrots; and when cut into small pieces and roasted, they are occasionally used in Germany as a substitute for coffee. A strong ardent spirit is distilled from them in some parts of Europe, 10 lbs. of carrots yielding about half a pint. C. seeds are employed as a diuretic, also as a carminative and stimulant; those of the wild C. being preferred.—Besides the crane fly, already noticed, carrots have numerous other insect enemies. One of the most troublesome is the carrot fly (*peila rosea*), a small dipterous fly, the larvæ of which, by eating away the surface of the root, cause what is commonly known as *rust* in carrots, and prepare them for the further operations of millepedes and other destroyers. The larvæ of several species of moth (*depressaria*) are very injurious to them when in flower and seed.

**CARROUSEL** (Fr.), a species of knightly exercise, which, down even to the beginning of the 18th c., was very common in all the courts of Europe. C. was a kind of imitation of the tournament, and for a time after the discontinuance of the latter, seems to have supplied its place. The dresses, for the most part, were those of the knights of former times, and the combatants, or rather competitors, were divided into two parties, usually according to their different nationalities. One of the favorite exercises in France consisted in running at the pasteboard head of a Moor or Turk with a lance, cutting it down with a sword, or firing at it with a pistol. Another of these tests of skill and horsemanship, if not of courage, consisted in carrying off a whole line of rings, which were suspended for the purpose. The C. in France was not known earlier than the reign of Henry IV.; but it had existed for some little time previously in Italy. There were brilliant carrousels under Louis XIII., and two celebrated ones were given in honor of Mademoiselle de la Vallière—the one at Paris in 1662, the other at Versailles in 1664. The place where the first of these fêtes was held, has ever since been called the place du carrousel. A revival of the C. was attempted at Berlin in 1750; and in 1828 the cavalry school at Saumur held one in honor of Madame la Duchesse de Berry. The so-called Eglinton tournament—an entertainment given some years ago by the chivalrous earl of Eglinton—was in reality a carrousel. In the U. S. this name is applied to a "merry-go-round," or movable platform fitted with wooden horses on which children ride.

**CARSE** is a term applied in Scotland to low lands adjoining rivers. The word is of uncertain origin. In Stirlingshire, it is restricted in its sense to the level alluvial soils which are only a few feet above the river Forth. In Perthshire, it also applies to the whole of the slightly undulating lands to the n. of the Tay, which form the C. of Gow-

rie. C. soils usually consist of argillaceous deposits, which produce crops of great luxuriance, although there are some which consist of hungry and barren clays. The richest of them are of a hazel color, and become friable when exposed to the action of frost; the poorest, on the other hand, are of a yellow color, containing little vegetable matter to render them amenable to cultivation. The best kinds of C. soils are generally farmed on the six-course shift—1. Grass; 2. Oats; 3. Beans; 4. Wheat; 5. Potatoes; 6. Turnips or fallow. Large crops of grass are grown when the clover-plant catches. It is mostly made into hay, and the after-math is used for soiling horses and cattle in the straw-yards. The land is seldom pastured, as the feet of animals trample and destroy the grasses, when the weather is wet. The oat-crop is more uncertain on the carse, but in favorable years, the yield is large, and the quality of the grain is excellent. Beans are very successfully grown, indeed the best of the C. soils are the best bean-soils in Scotland. Where the land is rich, and not too stiff, the potato is sometimes largely grown. On the poorest description of the C. soils, the potato does not thrive. Wheat can be grown in closer succession on the C. lands, than on any other description of land with the same expenditure of manure. A large stud of horses are required on C. lands, to enable the farmers to prepare the land for the various crops, at the moment when the season suits. A small portion of the land is still usually summer fallowed.

**CARSON**, a co. in Texas "Panhandle," formed 1876; drained by the n. fork of Red river: 900 sq. m. Pop. '90, 356. Co. seat, Panhandle.

**CARSON, ALEXANDER, LL.D.**, 1776-1844; an Independent or Congregational preacher of the n. of Ireland, officiating at Tubbermore for 30 years, within which time he became a Baptist and published *Baptism, its Mode and Subjects*.

**CARSON, CHRISTOPHER**, or "Kit Carson," b. Ky., 1809, d. Col., 1868; one of the most famous pioneers and scouts of the west. When about 24 years old he was appointed hunter to Bent's Fort, where he remained eight years; he was then engaged as a pioneer in Fremont's explorations among the Rocky Mountains. In 1847, he was made lieut. in a rifle corps of the regular army. In 1853 he drove 6,500 sheep over the plains and mountains to California. He was afterward Indian agent in New Mexico, and was instrumental in making a number of treaties of importance. In the civil war he did good service on the borders, and was brevetted brig-gen. The remarkable adventures of "Kit Carson" often surpass the most extravagant romance, though the most daring of them are literally true. Personally he was as modest as he was brave.

**CARSON CITY**, a city, capital of Nevada, and co. seat of Ormsby co., 4 m. from Carson river, 178 m. n.e. of San Francisco, on the Virginia and Truckee railroad. It is in a picturesque region near the base of the Sierra Nevada, and only about 10 m. from lake Tahoe. There is a branch mint in Carson City which receives immense deposits of silver and gold ore. There are a state-house, several churches and schools, and many mining and manufacturing establishments. Pop. '90, 8950. The state prison is 2 m. n.e. of the city.

**CARSON RIVER**, a stream in Nevada, rising in the Sierra Nevada, passing n. near Carson City and Lyon, and emptying into Carson lake, a body of water about 15 miles long, that appears to have no outlet.

**CARSTAIRS, WILLIAM**, a distinguished political and ecclesiastical character of the 17th c., who took a very active part in bringing about the revolution of 1688, was b. at Cathcart, near Glasgow, Feb. 11, 1649. He was educated at the village school of Ormiston, in East Lothian, and subsequently at the university of Edinburgh, where he displayed a remarkable aptitude for learning. In his 24th year, Scotland being then in a most unsatisfactory state, alike from a political and religious point of view, C. went to study theology at Utrecht. His scholarship, polite address, knowledge of men, and great political information, especially regarding his own country, recommended him to the notice of the prince of Orange, who chose him as his confidential adviser in all matters relating to Britain. In 1682, being in England on a mission of observation from Holland, he was employed to negotiate between the English and Scotch conspirators in the Rye House plot. With others implicated, he was arrested and put to the torture of the thumbscrew, but refused to confess anything that had not been previously revealed, and that only on condition that what he said should not be used in evidence, either directly or indirectly, against any other person. At this time, he had secrets from Holland of the greatest importance in his possession, which he carefully concealed, although there can be no doubt that their revelation would not only have saved him from torture, but have obtained for him great reward and honor. Britain, therefore, owes very much indeed to the firmness of C. at this juncture. He returned to Holland about the beginning of 1685; and, acting mainly on his advice, the prince of Orange planned and carried out the invasion of 1688. He accompanied the prince as chaplain, and after the settlement of the crown, when the prince had been firmly established as William III., C. was instrumental in effecting a reconciliation between him and the Scottish church, when the ill advice of other counselors had nearly led to an open rupture. From 1693 to the death of the king in 1702, he could not have had more influence in Scottish affairs if he had been prime-minister of the country; and his authority in church matters was such, that he was popularly called "cardinal Carstairs." He was elected principal of the university of Edinburgh in 1704, and in this capacity used all his influence with

government to obtain an increase of patronage for the Scottish colleges. In the same year he was presented to the church of Greyfriars, and was appointed moderator of the general assembly next succeeding, an office to which he was four times elected in the course of eleven years. He died Dec. 28, 1715, deeply regretted by the whole nation, and leaving a reputation for scholarship and sincere piety, as well as for unbounded charity and political sagacity rarely equalled. See *Life of C.*, by Rev. Dr. Story (1874).

**CARSTENS**, ASMUS JACOB, an eminent German artist, was b. near Schleswig, May 10, 1754. In 1762, he went to Copenhagen, where, when first introduced to the royal gallery of paintings and casts from the antique, he was so excited that he shed tears of joy. After staying seven years in the Danish capital, where he produced his "Baldur's Death," and "Eolus and Ulysses," supporting himself chiefly by portrait-painting, he commenced a journey on foot to Rome, but was obliged to return for want of means after reaching Mantua. He resided in Lubeck for some time, but through the kindness of a wealthy amateur artist named Rodde, he contrived to reach Berlin, where his great composition, the "Fall of the Angels" (with 200 figures), gained for him an appointment as professor in the academy, while his decoration of a saloon in the Dorville palace obtained for him an introduction to the king and a pension. He was now enabled to visit Rome, where he devoted himself to the study of the works of Michael Angelo and Raphael. His first work in Rome, a "Visit of the Argonauts to the Centaur Chiron," was distinguished by purity of style, beauty of forms, and fine distribution of light. His numerous subsequent drawings mostly represented scenes from the ancient classic poets, with subjects from Ossian, Dante, and Shakespeare. C. died May 26, 1798.

**CART**, a species of carriage with two wheels, in which respect it differs from the ordinary wagon that has four wheels. There are different kinds of carts, according to the nature of the goods or articles to be carried, and they also differ considerably in different countries. The C. is little seen in England, where the heavy and more capacious wagon takes its place. It is, however, used for agricultural and other purposes in Cumberland and adjoining northern counties. There, it differs only in a slight degree from the C. universally used in Scotland. The Scotch C. is an exceedingly convenient form of carriage for general merchandise, or for agricultural produce, and well adapted for being drawn on roads in a hilly country. A material advantage consists in its weight, being about only half a ton, while its usual load is from a ton to 22 cwt.; from which circumstance it is a particularly handy vehicle for comparatively light loads, and so far is superior to the English wagon, which is best adapted to carry huge loads of from two to three tons. In carrying hay, straw, or grain from the harvest-field, Scotch farmers employ a peculiar kind of C. without sides to admit of a bulky load; but they also, as occasion serves, use for a similar purpose an ordinary C., on which they place a movable frame. All grain for market is carried in the one-horse C., and a driver takes charge of two carts. The following advantages of one-horse carts are well enumerated by lord R. Seymour: "A horse, when he acts singly, will do half as much more work as when he acts in conjunction with another; that is to say, that two horses will, separately, do as much work as three conjunctively. This arises, in the first place, from the single horse being so near the load he draws; and in the next place, from the point or line of draught being so much below his breast, it being usual to make the wheels of single-horse carts low. A horse harnessed singly has nothing but his load to contend with; whereas, when he draws in conjunction with another, he is generally embarrassed by some difference of rate, the horse behind or before him moving quicker or slower than himself; he is likewise frequently inconvenienced by the greater or less height of his neighbor: these considerations give a decided advantage to the single-horse cart. The very great ease with which a low C. is filled may be added; as a man may load it, with the help of a long-handled shovel or fork, by means of his hands only; whereas, in order to fill a higher C., not only the man's back, but his arms and whole person must be exerted." To these just observations it need only be added that in many parts of England there is a wasted expenditure in horse-power, a pair of horses being often set to draw a clumsy wagon to market, containing a load which could with the greatest ease be drawn by one horse in a less ponderous machine.

The one-horse C. is employed by carriers all over Scotland, the load being usually piled high in a square form, and covered in with a woollen wrapper, in which state the C. is drawn 18 to 20 miles a day. See **CARRIERS**. In France and Germany, the carrier's C. is a more gigantic machine. Long in the body, very strong in construction, and poised on two high wheels with broad rims, this continental C. carries enormous loads, almost equal to what are seen in the large wagons of England. The ingenious manner in which the load is adjusted to rest exclusively on the wheels, and so relieve the single horse in the shafts, is matter of surprise to all strangers. All carts, whatsoever, in Great Britain, must bear the name and address of the owner, painted conspicuously on them, according to statute 1 and 2 Will. IV. c. 22. See **WAGON**.

**CARTAGENA**, a fortified seaport of Spain, on a bay of the Mediterranean, in lat 37° 36' n., long. 0° 57' w. It is built partly on the declivity of a hill, and partly on a plain extending down to the sea, and is inclosed by hills which screen it from all winds. The harbor is one of the best in the Mediterranean, capacious enough to hold the largest

fleets. The entrance is narrow, and completely commanded by the fortifications on an island called La Isoletta, on the south. It was formerly the largest naval arsenal not only in Spain but in Europe. The city, which is surrounded by walls, has a Moorish aspect; its streets, cathedral, and the ruins of an old castle being of that architecture. C. has manufactures of sail-cloth and glass, besides extensive blast-furnaces and smelting-works, and a trade in barilla, agricultural produce, and esparto grass. The tunny fishery is important, and its ancient silver and lead mines, recently re-opened, are again productive, as are the zinc and iron mines. Pop. of town and suburbs, 1887, 84,171. C., which was a colony of the Carthaginians, was built by Hasdrubal 243 B.C., under the name of New Carthage. It formed the headquarters of the Carthaginians in Spain, and soon became a city of much wealth and influence. It was captured by P. Scipio, in 210 B.C., and became of importance under the Romans, who are said to have employed 40,000 men daily in the mines in the neighborhood.

**CARTAGENA**, in Colombia. See **CARTHAGENA**.

**CARTE**, THOMAS, an English historian, distinguished for his industry and research, was b. at Clifton, in Warwickshire, where his father was parish minister, in 1686. Educated at Oxford, he afterwards took the degree of M.A. at Cambridge, and entering holy orders, was appointed reader at the Abbey church, Bath; but being attached to the Stuarts, he resigned his office rather than take the oaths to the new government. In 1732, he was suspected of having been concerned in the conspiracy of bishop Atterbury, whose secretary he was, and £1000 was offered for his apprehension; but he escaped to France, where he remained for some years. On his return to England, he published a life of the duke of Ormond, remarkable for the fullness of its information. In 1747-53, he published a *History of England*, bringing it down to the year 1654. This work is very valuable for its facts, but the author had not the capacity to grapple with these philosophically. Hume and other historians, however, have been much indebted to him for the materials of history. Among his other works was an edition of Thuanus; and at his death, in 1754, he left behind him 20 folio and 15 quarto volumes of MSS., in further illustration of the history of England to 1688, which have proved of great utility to subsequent writers. These are preserved in the Bodleian library, Oxford.

**CARTE BLANCHE** (Fr. *carte*, paper *blanc*, *blanche*, white), a blank paper authenticated with an authoritative signature and intrusted to some one to be filled up as he may think best. Thus, in 1649, Charles II. tried to save his father's life by sending from the Hague to the Parliament a signed *carte blanche* to be filled up with any terms which they would accept as the price of his safety. By a metaphorical application, the term has come to denote unlimited authority, freedom to do as one wills.

**CARTEL**, during a time of war, is an agreement between the belligerents for an exchange of prisoners. Sometimes the name is given to a ship, called by the French a *bâtiment parlementaire*, commissioned to convey the exchanged prisoners, or to carry messages to the enemy.

**CARTEL**, THE. See **POLITICAL PARTIES**, GERMAN.

**CARTER**, a co. in n.e. Kentucky, on Little Sandy river; 544 sq. m.; pop. '90, 17,204. Co. seat, Grayson.

**CARTER**, a co. in s.e. Missouri, on Current river; 500 sq. m.; pop. '90, 5799. Co. seat, Van Buren.

**CARTER**, a co. in n.e. Tennessee, on the North Carolina border, in the highest part of the state, watered by the Watauga, Doe, and affluents of Holston rivers; 298 sq. m.; pop. '90, 13,389, with colored. East Tennessee and Western North Carolina, and the Bristol, Elizabethton, and North Carolina railroads traverse the county. Co. seat, Elizabethton.

**CARTER**, FRANKLIN, PH.D., LL.D., American educator, was born in Waterbury, Ct., in 1837. After preparing for college at Phillips Academy, Andover, Mass., he studied at Yale and Williams, graduating at the latter in 1862. After a course of study at the University of Berlin, he returned to America; from 1865 to 1868 was professor of Latin and French at Williams College, and from 1868 to 1873 was professor of Latin alone. In 1872 he was called to Yale, where he was professor of German until 1881, and during that period he studied theology and was licensed to preach. In 1881 he was chosen President of Williams College, in that year receiving the degree of LL.D., from Union College. He has published an edition of *Iphigenie auf Tauris* (1879), and has contributed articles to the *New Englander*, the *Transactions of the American Philological Society*, and the *Transactions of the Modern Language Association of America* (of which latter society he was the first president), and to other journals. Under his presidency Williams College has made rapid and solid progress in the acquisition of material resources and in the expansion of courses of instruction.

**CARTERET**, a co. in e. North Carolina, on Pamlico sound and the Atlantic ocean, traversed by the Atlantic and North Carolina railroad; 510 sq. m.; pop. '90, 10,825, with colored. Much of the surface is occupied by swamps and pine forests. Productions mainly agricultural. Co. seat, Beaufort.

**CARTERET**, JOHN, Earl GRANVILLE, a distinguished orator and statesman of the 18th

c., was b. April, 1690, his father being baron Carteret of Hawnes, Bedfordshire. His education, commenced at Westminster school, was completed at Oxford. From the latter place, according to Dean Swift's humorous assertion, he carried away more Greek, Latin, and philosophy than was at all becoming a person of such high rank. Introduced into the house of peers in 1711, he spoke in favor of the Protestant succession, and in consequence received the early notice of George I., and obtained some lucrative appointments. In 1718-19, he was appointed ambassador extraordinary to Sweden, and in the following year succeeded in concluding a peace between Sweden, Prussia, and Hanover. In 1721, he was appointed secretary of state, and in this capacity defended with great zeal the proceedings of government in the Atterbury conspiracy. In 1724, he was made lord lieutenant of Ireland. During his vice-regency, he was in constant intercourse, and held frequent discussion, with Dean Swift about public affairs. His lord lieutenantancy, which lasted from 1724 to 1726, and again from 1729 to 1780, was popular, particularly the latter period. From 1730 to 1742, he was one of the most able and determined of the leaders of the opposition in the house of lords against sir Robert Walpole, and on his displacement, was made a secretary of state. On the death of his mother, in 1744, he succeeded to the title of earl Granville, and in the same year had to resign his seals of office, the Broad-bottom Administration (q.v.) expressly excluding him; but he continued to receive marks of the royal favor. C. was a most liberal patron of men of letters. He died Jan., 1763.

#### CARTESIAN PHILOSOPHY. See DESCARTES.

**CARTHAGE**, city and co. seat of Jasper co., Mo., in the lead regions, on the line of the Missouri Pacific and the St. Louis and San Francisco roads, 220 m. s.w. of Jefferson City. On July 5, 1861, a force of confederates under Gen. Jackson and Gen. Price, consisting of about 3500 men, while retreating from the main army of Gen. Lyon, were, at a point about 7 m. e. of Carthage, confronted by Gen. Sigel with about 1500 union troops. Gen. Sigel, being superior in artillery, gave battle, which continued several hours with much loss to the confederates, when, to prevent the confederate cavalry from outflanking him and to protect his baggage train, Gen. Sigel fell back in good order, and continued his retreat to Carthage and Sarcoxie, 15 miles to the east. C. has zinc mines, stone and lime works, foundries, flour mills, manufactories of plows, carriages, etc., banks, newspapers, a court-house, public library, and several parks. The water-power is obtained from Spring river,  $\frac{1}{2}$  m. n. of the city. Pop. '90, 7891.

**CARTHAGE**, called *Carthago* by the Romans, *Carchidon* by the Greeks, both of which are but forms of the native name *Karth-hadtha*, i.e., "New Town" (found on ancient coins), was the greatest city of antiquity on the n. coast of Africa, and was situated in what now constitutes the state of Tunis, on a peninsula extending into a small bay of the Mediterranean sea. It was founded, according to legend, by Dido (q.v.), a Phœnician queen, who had fled from Tyre after the murder of her husband, almost nine centuries before the Christian era, but more probably (like the Anglo-Indian Calcutta) it originated in an emporium or *factory* established by the colonial merchants of Utica, and the capitalists of the mother-city Tyre, on account of the convenience of its situation. Unfortunately, we know very little of its growth. Our information only begins after C. had become one of the greatest commercial cities of the world, and we have but very scanty and one-sided accounts of it even then. The number of the inhabitants before its destruction amounted to about 700,000. The population was partly of Phœnician, partly of Libyan descent. The territory which the Carthaginians acquired by the subjugation of the Libyan tribes, and by the ultimate annexation of other older Phœnician colonies, with which they had at first been simply in alliance, such as Utica, Hadrumetum, Tunis, Hippo, the two Leptæ, etc., extended in the middle of the 5th c. B.C. southward to lake Triton, eastward to the Great Syrtis, and westward to Hipperegus (now Bona). The maritime power of the Carthaginians enabled them also to extend their settlements and conquests to the other coasts of the Mediterranean. In the 6th c. B.C., they were masters of Sardinia, and had begun to contend for the possession of Sicily. Hanno (q.v.) founded colonies on the w. coast of Africa beyond the straits of Gibraltar, and Himilco visited the coasts of Spain and Gaul. The relations of C. to foreign states in earlier times are not very clear. The first treaty with the Romans was concluded in 509 B.C.; the second, in 348 B.C.; the third, in 306 B.C. The connected history of C. begins with the 5th c. B.C., a period of wars between the Carthaginians and the Greeks in Sicily. The Carthaginian army under Hamilcar was destroyed by Gelon at Himera in 480 B.C. It was not till 410 B.C. that the war began which ended in the conquest by the Carthaginians of some parts of the island. Dionysius the elder, or rather the pestilence working for him, put a stop to their conquests, but did not succeed in expelling them. War raged almost constantly between Dionysius and the Carthaginians. The more feeble reign of Dionysius the younger afforded them an opportunity of extending their conquests, yet they were frequently repelled and defeated by the Sicilian Greeks; and during 311-301 B.C., Agathocles carried the war into Africa, and attacked C. itself. After his death, the Carthaginians again increased their dominions in Sicily, and although Pyrrhus contended successfully against them at first, he left that island entirely in 275 B.C. The subjugation of the s. of Italy by the Romans, brought the two great and conquering nations into collision, and the first Punic war arose, 264 B.C., and after

a great naval victory of the Romans, terminated in 241, the Carthaginians giving up Sicily, Sardinia, and Corsica, and paying to the Romans a large sum of money. Soon after this, a mutiny of the hired troops of C., combined with an insurrection of the Libyan tribes, the ancient inhabitants of the country, who were kept down by the arbitrary rule of the Carthaginian colonists, threatened the entire ruin of the city. Hamilcar brought that bloody war, however, to a successful termination, and led an army to Spain, where he, and after him Hasdrubal, obtained great successes. Here was founded New C., now Cartagena (q.v.). After Hasdrubal's death, 221 B.C., Hannibal (q.v.), burning to revenge the defeat which his native city had sustained from the Romans, broke the treaty with them, and took Saguntum, 219 B.C. Thus began the second Punic war, in which Hannibal pursued his career of conquest from Spain, through Gaul, and across the Alps into Italy itself, defeated the Romans with terrible slaughter in various battles, and, by that of Cannæ in particular, brought Rome to the very brink of ruin. Yet the war terminated in the total defeat of the Carthaginians by Publius Cornelius Scipio, who overthrew their power in Spain, and was victorious over Hannibal in the final and decisive battle of Zama, in Africa, in Oct., 202. A peace was then concluded, in which the Carthaginians were limited to their African territories; but most of their ships of war and war-elephants were taken from them, besides an immense sum of money, and they were taken bound not to make war without permission of the Romans. Massinissa, king of Numidia, skillfully availed himself of dissensions which arose within C. between the nobles and the people, to advance his own interests at the expense of the Carthaginians; and as they (151 B.C.) opposed him, and drove his adherents out of the city, the Romans seized the opportunity for a new declaration of war, 149 B.C., on the ground that the treaty was broken; and after a siege of two years, C. was taken by Publius Cornelius Scipio Æmilianus, 146 B.C. For six days the combat was maintained in the streets of the city, and for seventeen days the work of its destruction by fire was carried on by the conquerors. The country became a Roman province. C. Gracchus sent out 6,000 colonists to found a new city on the site of Carthage. It was called Junonia, but it did not prosper. Augustus, carrying out the intention of his great uncle, restored the city, and the new C. had become, in the second and third centuries of the Christian era, one of the finest cities of the Roman empire. In 439 A.D., Genseric made it the capital of the Vandal kingdom; Belisarius conquered it in 533, and named it Justiniana; the Arabs under Hassan utterly destroyed it in 647 A.D.; and now only two or three small hamlets and a few ruins mark its site.

We have not very satisfactory accounts of the constitution of the Carthaginian state. It is certain that it was oligarchical, and that the chief power was in the hands of the great families (*gentes*), from whose members the senate, amounting to 300, was chosen. This senate appointed, as it were, a more select council of 30, and sometimes a still smaller one of only 10, at the head of whom were two *suffetes* (probably the same as the Hebrew *shofetim*, "judges"), but it is not certain what relation these bore to one another, or how their power was apportioned between them. We can gather dimly, from various scattered statements, that the Carthaginian oligarchy, while despising the multitude, was itself split up into factions, and torn by family jealousies. Corruption largely prevailed; and it would perhaps have been better for the country if the power had been in the hands of a popular despot than of a band of insolent and tyrannical nobles.

The Carthaginian army was raised from the conscription of the subjugated Libyans, from the hired Numidians, and from slaves. In the time of Agathocles, the city sent forth 40,000 heavy armed infantry, 1,000 cavalry, and 2,000 war-chariots, but the state could easily raise 100,000 troops. The fleet in the first Punic war consisted of 850 ships, carrying 150,000 men. How C. contrived to raise revenues sufficient to cover the enormous expense her military and naval organization involved, is not very clear. It was, in all likelihood, derived from tribute imposed on subject Libyan or Numidian races, in great part from mines in Spain, and from import duties derived from her maritime and inland trade, which was prodigiously great. Her merchantmen visited every coast and island of the Mediterranean, and even ventured as far as the Azores, Britain, the Baltic, etc.; while her caravans penetrated through Sahara to the gold-producing districts of the Niger, and through the Libyan desert to the lands along the Nile.

The religion of the Carthaginians appears to have been substantially the same as that of the Phenicians—a worship of the stars and of fire. Moloch was the chief deity, and to him children and captives were sacrificed. The highest natural manifestation of this deity was the sun. Besides Moloch, the Carthaginians worshiped the Tyrian Hercules; Astarte, the goddess of the elements; Esmun, the god of the celestial vault; and a variety of heros, heroines, and genii or spirits, such as the Genius of Death, Hamilcar (who fell at the battle of Himera), Dido, the brothers Philæni, etc., as well as a few of the lesser Greek divinities, of whom a knowledge had been obtained in Sicily. It does not appear that there was a distinct sacerdotal order in Carthage. Probably religious ceremonies were performed by the dignitaries of the state, but our knowledge on this interesting point is too meager to permit of our arriving at any very definite conclusion. See A. Church, *Carthage, or the Empire of Africa* (1886).

**CARTHAGE, CAPE**, a headland of N. Africa, jutting into the Mediterranean, in lat. 36° 52' N., lon. 10° 23' east. Traces of the ancient city of Carthage (q.v.) are found on it to the N. of the Tunis lagoon.

**CARTHAGENA**, or **CARTAGENA**, a fortified seaport and capital of the state of Bolívar, United States of Columbia, stands on a sandy island a little to the southwest of the mouth of the Magdalena river, and is connected by bridges with its suburb Jetsemani, on the mainland. Founded by the Spaniards in 1533, Carthagena was in 1585 sacked by the English under Sir Francis Drake, and in 1741 was besieged by the fleet of Admiral Vernon. Its walls and defences were completed in 1717 at a cost of \$59,000,000. In 1815 it was reduced by the royalist Gen. Morillo, but in 1821 it was freed from Spanish rule. The temperature ranges from 80° to 86° F., but the climate is salubrious, although Carthagena has been ravaged at intervals by yellow fever. The harbor is the best on the coast, and the main entrance, Boco Chica, is defended by two strong castles. The exports, which consist of cotton, sugar, hides, tobacco, coffee, and other articles, are sent chiefly to Germany, Great Britain, and the United States. A canal connects Carthagena with Calamar on the Magdalena. The city is well built and has a cathedral, a university, a naval arsenal, a city hall, hospitals, and other public buildings. Pop. 1887, 12,000; estimated in 1895 at 20,000.

**CARTHAGENA BARK.** See **CINCHONA**.

**CARTHA'GO**, a term of various application in Central America.—1. An almost landlocked bay or lagoon of the Caribbean sea, near the n.w. extremity of the Mosquito shore.—2. A river entering the same from the s.s.w., about lat. 15° n., and long. 84° west.—3. A river of Costa Rica, flowing into the gulf of Nicoya, an inlet of the Pacific, near lat. 9° 36' n., and long. 84° 30' w.—4. A city, or rather the ruins of one, on the same, about 60 m. from its mouth. Down to 1841, it was the capital of Costa Rica; but being in that year all but destroyed by an earthquake, it was supplanted by San José, previously its superior in wealth and importance, about 15 m. to the w.n.w. of itself. The volcano of its own name, doubtless connected with its overthrow, is valuable as a landmark to mariners.

**CARTHA'GO NOVA.** See **CARTAGENA**.

**CARTHAMINE**, or **CARTHAMEINE**. The dye so called is obtained by a chemical process from safflower (q.v.), (*carthamus tinctorius*) in crystals which are insoluble in water, but slightly soluble in alcohol and ether. When newly precipitated, C. immediately and permanently attaches itself to cotton or silk, but not to wool, requiring no mordant, dyeing the fabric a fine red, which is changed to yellow on the addition of alkalies, and may be returned to red again on being treated with acids.

**CARTHUSIANS**, a monastic order which owes its origin to St. Bruno, who retired in 1066 with six companions to the solitude of La Chartreuse (whence the name), near Grenoble, where they built hermitages, wore rude garments, and lived upon vegetables and coarse bread. In 1134, the fifth prior, Guigo, composed a body of rules, called the *Statuta Guigonis* or *Consuetudines Carthusie*, but they have been often changed. After 1170, when the order received papal approbation, it extended rapidly. It dates from 1180 in England, where the name of Chartreuse-houses was corrupted into charter-houses. The C. were divided into two classes, fathers (*patres*) and brothers (*conversi*). Each occupied a separate cell, with a bed of straw, a pillow, a woollen coverlet, and the means of manual labor or of writing. They left their cell, even for meals, only on festivals and on days of the funeral of a brother of the order. Thrice a week, they fasted on bread, water, and salt, and there were several lengthened fasts in the year. Flesh was forbidden at all times, and wine, unless mixed with water. Unbroken silence, except on rare occasions, was enforced, as well as frequent prayer and night-watching. These austerities were continued, with little modification, by the modern Carthusians. The order at one time counted 16 provinces, and can still boast some of the most magnificent convents in the world—as *La Grande Chartreuse*, near Grenoble, and *Certosa*, near Pavia. They were given to hospitality and works of charity, and were on the whole better educated than the mendicant orders. Their principal seats were in Italy, France, and Switzerland; but they have shared the fate of the other monastic establishments, and their convents are now for the most part solitudes indeed. The Carthusian nuns arose at Salette, on the Rhone, in France, about 1229. They followed the rules of the Carthusian monks, but with some mitigations, of which the most notable is that they have a common refectory. See *illus., PRIESTS, MONKS, AND NUNS*, vol. XII.

**CARTIER**, Sir **GEORGE ÉTIENNE**, 1814-73; a lawyer of Canada, educated at St. Sulpice, Montreal. He was one of the Papineau "rebels" in the abortive revolution of 1837-38, but was forgiven; and became a member of the provincial legislature, secretary, and attorney-general. In 1858, he became premier. He was instrumental in abolishing feudal tenure in Lower Canada, in making the legislative council elective, in codifying the laws, in decentralizing the judiciary, and in bringing about the confederation of the colonies. There is a monument to him in Ottawa.

**CARTIER**, **JACQUES**, b. 1494, in Brittany. In 1534 he sailed from St. Malo in command of two ships to explore the n.e. coast of America. He touched at Cape Buenavista, Newfoundland, passed up the straits of Belle Isle and discovered the mainland of Canada, which he claimed for France. The next year, with another expedition, he sailed up the St. Lawrence as far as Hochelaga, a large fortified native village at the foot of a



hill, which he named Mont Royal (now Montreal). Disgusted with the severe climate, and his men being sick with scurvy, he went back to France in 1536, and nothing was done towards colonization until 1540, when Jean Francis de la Roche, sieur de Roberval, obtained leave to form a settlement. In 1541, Cartier was sent out in command of five ships, and near the present Quebec he built a fort and named it Charlesbourg; but the Indians, whose chief he had carried off in his previous voyage, gave him so much trouble that he returned to France. Cartier appears no more in public life except as seigneur of his native village of Limollin, where he was living as late as 1552.

**CARTILAGE** is a firm elastic substance, of a pearly whiteness, presenting to an unaided eye a uniform and homogeneous appearance. Cartilages may be divided into the *temporary*, the *permanent*, and the *accidental*. The *temporary* cartilages are substitutes for bone in the earlier periods of life, and after a certain time become ossified. See **OSTEOLOGY**. At birth the extremities and larger eminences of the long bones, and the margins of the flat bones are still cartilaginous, and this C. does not altogether disappear till the period of puberty. The *permanent* cartilages are either *articular* or *non-articular*. *Articular* cartilages are attached to the extremities of bones, and enter into the formations of joints. *Non-articular* cartilages are usually more flexible than the articular. They are sometimes attached to bones, to lengthen them out, as, for instance, in the nose, the auditory canal, and the Eustachian tube. See **E.A.R.** In other cases they form the basis of distinct organs, as the larynx, the trachea, and the eyelids. *Accidental* cartilages are cartilaginous concretions, which are occasionally found in situations where they do not normally occur, and are of no general interest. The physical properties of cartilages, especially their elasticity, resisting power, and incapability of extension, are such as to fit them admirably for the functions which they have to perform in the animal economy. A brief notice of the microscopical characters of C. will be found in the article **CELLS**, and a reference to its chemical composition will be found in the articles **GELATINOUS TISSUES** and **GLUTEN**.

**CARTILAGINOUS FISHES** are those fishes which have a skeleton destitute of bony fibers. In some of these fishes, the skeleton is merely rudimentary, so that they seem to form an intermediate link between vertebrate and invertebrate animals. In the lancelets (q.v.), (*amphioxus*), it consists of nothing more than a slender, transparent, flexible dorsal column; in *myxine* also it is a soft flexible tube, without appearance of vertebrae or of ribs; in the lampreys, the dorsal column is still a mere cylinder of cartilage, without any notable division into segments; whilst even in the sturgeon, the center of the backbone is a continuous gelatinous cord, and in the sharks the vertebrae are formed of hollow cones, meeting at their apexes in the middle, and having their cups filled with the remains of the gelatinous cord, an arrangement from which result great elasticity and flexibility. In many instances, even in the higher C. F., several vertebrae are united in a single piece; in all of them the skull is formed of a single piece without sutures, although the general form agrees with that of the skull of other fishes, and the same parts or regions may be recognized. The calcareous matter present in the skeleton is always deposited in a granular manner, giving a characteristic dotted appearance; but even in the skull of the basking shark, one of the most highly organized, the earthy matter has been found to form little more than 8 per cent of the whole substance; in the skeleton of the lamprey, it is only 1½ per cent. In other parts of their organization, C. F. differ from each other very widely; some of them possessing the organs of the senses in as great perfection as any fishes whatever, whilst in others these organs are very imperfectly developed. Linnaeus placed the C. F. along with batrachian reptiles in his class *amphibia*. By the general consent of naturalists, however, they are placed in the class of fishes. Cuvier, referring to the very different degrees of organization which they exhibit, says "they form a series ranging parallel to the bony fishes just as the marsupial mammalia range parallel with the other ordinary mammalia." Owen and others, admitting the justice of this view, have, however, pointed out in the C. F. generally, characters corresponding with those of the osseous fishes in their embryotic state, and with the permanent or mature conditions which prevailed among the fishes of some of the older geological periods. One remarkable characteristic even of the higher groups of C. F.—sturgeons, sharks, rays, etc.—is the *heterocercal* tail, the vertebral column being prolonged into the upper portion of the caudal fin, and the lower one given off on its under side, as in the fossil fishes generally of the old red sandstone and other oldest fish-producing rocks. Cuvier divided C. F., or *chondropterygii* (Gr. cartilage-finned) into 3 orders: *sturiones* (sturgeon, chimera, etc.), having the gills free, and gill-openings with a lid, like the osseous fishes; *selachii* (sharks and rays), having the gills fixed, and consisting of folds of membrane on a plane surface, with numerous gill-openings, the jaws movable as in other fishes generally; and *cyclostomi* (lampreys, etc.), also having fixed gills and numerous gill-openings, the mouth adapted for sucking. Muller and Owen, however, separate the *cyclostomi* of Cuvier from the other C. F., on account of important anatomical differences, particularly in the structure of the heart, which in the *cyclostomi* wants the *bulbus arteriosus*, or thick muscular swelling of the commencement of the arterial system close to the ventricle; whilst this, which may, in fact, be considered as a third chamber of the heart, is present in the *sturiones* and *selachii*, and within it, are 3 or more longitudinal rows of valves; characters derived from the vascular system being

deemed by these great naturalists of the highest value in determining the arrangement of the class of fishes. The lancelets occupy a place by themselves, from their absolutely wanting a heart, and having the circulation carried on by the muscularity of the entire vascular system.

**CARTOON** (Ital. *cartona*, pasteboard; from Lat. *charta*, paper). In the fine arts, C. is a design on strong paper, of the full size of a work to be afterwards executed either in fresco, oil color, or tapestry. The object of the artist in preparing a C. is, that he may adjust the drawing and composition of his subject in circumstances in which alterations can be effected with facility, before proceeding to the execution of the work itself. Cartoons are generally composed of a number of sheets of stout paper or pasteboard, pasted together at the edges, and stretched on a frame. The surface is sometimes *primed*, or washed with a ground-color; but more frequently this process is dispensed with. The drawing is made either in chalks or in *distemper* (q.v.), in which latter case the C. itself has very much the appearance of a fresco. Frequently only two colors are used, merely for the purpose of producing light and shade, in which case the C. is said to be in *chiaro-oscuro*. The C., when finished, is transferred to the canvas or plaster on which the work is to be executed, either by tracing with a hard point, or by pricking with pins, charcoal in both cases being used. Sometimes lines are simply drawn across it, or, if it is wished to preserve it from injury, threads are stretched across it from pins placed at the required distances along the edges. In *fresco* painting (q.v.), the plaster on which the work is executed must be kept wet, in order that it may absorb the color, and consequently only a small portion can be executed at a time. For this reason, the C. must be traced in small compartments of the size that the artist can finish without stopping. It is here, consequently, above all, that the necessity for the previous execution of a C. is greatest, as it would be impossible to sketch the whole design on the plaster in the first instance. But the great masters used such studies in *chiaro-oscuro* as guides to them in almost all their more extensive works, and many of these monuments of their care, as well as of their genius, have been preserved. We have cartoons of Andrea Mantegna, Domenichino, the Caracci, etc.; but the finest specimens of cartoons in existence are those of Raphael at Hampton court. These marvelous conceptions were sent to Flanders in the reign of Leo X., in order that they might be copied in tapestry in two sets, one of which was designed for the pope, the other for a present by the pope to Henry VIII. of England. The tapestries, which are very inferior to the designs, are still in existence. One set is in Rome, the other was in England till the death of Charles I., when it was purchased by the Spanish ambassador and carried to Spain. At a recent period it was brought to London and offered for sale, but as no English purchaser was found, it was again carried to the continent. For many years the cartoons, originally twenty-five in number, lay neglected at Brussels, and many of them were destroyed. The seven now at Hampton Court were at length purchased by Rubens for King Charles I. It is an instance of Cromwell's good sense, in a direction in which it was not often exhibited, that at the dispersion of the royal collections, these cartoons were purchased for the nation by his special command. So low was the artistical taste of the time, however, that whilst the "Triumph of Julius Cæsar," by Andrea Mantegna, still at Hampton court, was valued at £2,000, the cartoons of Raphael were set down at £200! In Charles II.'s time, these remarkable works were again consigned to oblivion. An attempt was made to have them copied in tapestry, by which they were seriously injured. William III., strangely enough, followed in Cromwell's footsteps in appreciating what Charles II. had neglected. He had the cartoons restored, and built a gallery for them at Hampton Court, where, with the exception of a visit to Windsor in George III.'s time, they have since sojourned. The following are the subjects represented: 1. Paul Preaching at Athens; 2. The Death of Ananias; 3. Elymas, the Sorcerer, struck with Blindness; 4. Christ Delivering the Keys to Peter; 5. The Sacrifice at Lystra; 6. The Apostles Healing the Sick at the "Beautiful Gate" of the Temple; 7. The Miraculous Draught of Fishes. Our space and our design equally preclude us from attempting any statement of the merits of these exquisite compositions. Several of the lost cartoons are partially transmitted to us by engravings, some of which were executed from the tapestries; others, it is believed, from the originals. The subjects of these are—1. The Adoration of the Kings; 2. Christ appearing to Mary Magdalene; 3. The Disciples at Emmaus; 4. The Murder of the Innocents; 5. The Ascension. These were engraved, along with the others, by Somereau, a French engraver, in 4to. Other cartoons of Raphael exist—one the property of the duke of Buccleuch, and two in the possession of the king of Italy, which are said to have belonged to the set sent to Flanders. There is also a portion of one in the national gallery in London, but it is now painted over with oil color. The best engravings of the cartoons at Hampton Court are by Dorigny, Audran, and Halloway. The name cartoon is also applied to full-page sketches in journals and other publications; perhaps most often to illustrations of a comic nature such as those in *Punch* and *Harper's Weekly*, the most famous cartoons in the latter periodical having been those of Thomas Nast (q.v.). See CARICATURE.

**CARTOUCH** is a word much used in the French military service, but less frequently in the English. The name was once given to a wooden case containing 200 to 300 musket-bullets, and 8 or 10 1-lb. balls, fired from a mortar or howitzer in defense of a

ditch or intrenchment; but such missiles have been superseded by others. The cartridge-box carried by the soldiers used to be called a C. in England, and still is in France.

**CARTOUCHE**, the name by which the French, and we after them, designate the ovals on which the hieroglyphic characters for the names of Egyptian kings are sculptured. See *CAVO-RILIEVO*. C. is also used to signify a tablet, either for ornament or to receive an inscription, so formed as to resemble a sheet of paper or parchment, with the edges and ends rolled up. Cartouches are often seen on tombs. The same term is sometimes applied to modillions, or brackets supporting a cornice.

**CARTOUCHE**, LOUIS DOMINIQUE, 1698-1721; the leader of a band of robbers and assassins in France, whose crimes created great terror in Paris. For many years he eluded the police, but at last was arrested by chance in a low drinking-house. He had a long trial, which created a great deal of interest, and was finally sentenced to death, and broken on the wheel before an immense assembly of approving spectators.

**CARTRIDGE** is a cylindrical case made to contain either the whole or a part of the materials for discharging from a fire-arm. Those for ordnance or large guns are chiefly made of serge and flannel, sewn up into the form of a bag, which, supplied with a given weight of powder, is tied round the neck, and strengthened by iron hoops. The weight of powder varies from about 800 lbs. for an 81-ton gun, to a few ounces for a mountain gun.

Cartridges for small-arms which load at the muzzle are usually paper tubes, containing a leaden ball and a few drachms of powder. The tubes are made in such a way that the powder has two or three thicknesses of paper around it, while at the mouth of the tube and over the bullet there is only one. The paper over the bullet is lubricated generally with a composition of beeswax and tallow. In loading, the paper at the mouth of the tube has to be twisted or bitten off; the powder is then poured into the barrel, the tube reversed, and the bullet inserted into the muzzle, and the tube broken away. Cartridges for breech-loading small-arms are generally formed of a thin sheet of brass coiled into a cylinder, and having an iron case, in the center of which is the percussion arrangement. Those used for the Snider and the Martini-Henry rifles are described in the article on *BREECH-LOADING ARMS*. Besides the C. case of coiled brass, there are others made of solid brass or copper (an American invention), and these seem to be gaining favor abroad, the Prussians having adopted such a case for the new Mauser rifle.

For muzzle-loading shot guns, the chief cartridges used contain a charge of shot packed in a paper cylinder of a size suitable for the bore of the gun. Some of these, in addition to the paper covering, are surrounded with a wire net-work, for the purpose of increasing the range and penetration.

The C. for breech-loading shot guns is usually a stout cylinder of paper with a metal case. They are made of various sizes to suit the different calibers of guns, and with pin or central fire ignition. In the pin-fire C., a small brass pin passes through the side of the case into the percussion cap, and protrudes through a small hole in the top of the barrels. The pin is struck by the hammer of the gun, and forced into the percussion cap, which explodes, and ignites the powder. In the central-fire C., the cap is in the center of the case, and is exploded by the hammer of the gun acting on a piston contained in the false breech.

In America, a solid brass C. case is often used for shot guns.

For sporting rifles, the cartridges are quite as numerous and as varied as for shot guns. With large-bore rifles the same C. case is generally used as for shot guns, but loaded with powder and ball (spherical, solid conical, hollow conical, or shell). For small-bore, or what are known as express rifles, either a coiled brass C. case, similar in construction to that for the Snider or Martini-Henry rifle, but made to contain a larger charge, or a solid brass case is used. The coiled case can be reloaded twice or thrice, while the solid case can be reloaded as often as twenty times, and on this account the latter is rapidly gaining favor with sportsmen in India and Africa. The express C. contains a very heavy charge of powder, with a light hollow conical bullet giving very great velocity, low trajectory, and immense killing power. In the Henry express C., the charge of powder is 4 drachms, while the bullet weighs only 270 grains.

Cartridges for breech-loading pistols and revolvers are generally small metal cylinders containing a charge of powder and a bullet. See *illus.*, *CANNON*, vol. III., figs. 41, 53, 55, 58, 59; also see *illus.*, *GUNS*, vol. VII.

**CARTRIDGE-PAPER**, a light-colored strong paper, originally manufactured for soldiers' cartridges (q.v.), is extensively used in art, its rough surface being useful for certain kinds of drawing; name also given to a line of wall papers.

**CARTWRIGHT**, EDMUND, celebrated on account of his invention of the power-loom, was b. April 24, 1743, at Marnham, Nottinghamshire. Educated at Oxford, he obtained a living in the English church, and devoted himself exclusively to his ministerial duties and to literature, until a casual conversation, in 1784, directed his attention to machinery, and in 1785 he exhibited his first power-loom (q.v.) in action, an ingenious though very rude machine; upon which, however, he subsequently effected improvements rendering it almost perfect. Its introduction was vehemently opposed, and a mill fitted up with

500 of his looms was ignorantly and maliciously burned down. C., in 1790, took out a patent for combing wool, and secured patents for various other improvements in connection with manufactures. But his patents yielded him little return, and, in 1809, government, in consideration of his inventions, granted him £10,000. C. was the author of a legendary poem, entitled *Arminia and Elvira*, and other poetical pieces. He died Oct., 1823. His daughter published a *Life* (London, 1843).

**CARTWRIGHT, JOHN**, 1740-1824; usually called maj. C.; in the English navy in his youth. He was present at the capture of Cherbourg, and subsequently on the Newfoundland station, when he was appointed chief magistrate of the settlement, discharging the duties of the office with great ability for five years. When the dispute with the American colonies began, he espoused their cause, declining to fight against them, and thereby rejecting an almost certain high military or naval promotion. In 1774, he published *American Independence the Glory and Interest of Great Britain*. The next year he was appointed maj. in the Nottingham militia, which position he served for 17 years, being finally superseded because of his political opinions. In 1776, he appeared in print as the advocate of parliamentary reform, and thenceforth devoted his life to the attainment of universal suffrage and annual parliaments. In 1778, he was an unsuccessful candidate for Nottinghamshire, and the same year founded the "society for constitutional information," a body which embraced many of the distinguished men of the day, and from which organization rose the famous "corresponding society." His work in the furtherance of reform was incessant. In 1819, he was indicted for conspiracy, found guilty the following year, and sentenced to pay a fine of £100. He spent his last years in London. He was married, but left no children. In 1831, a monument to him was erected on Burton Crescent.

**CARTWRIGHT, PETER, D.D.**, 1785-1872; a native of Virginia; settled in early life in Kentucky, where, in 1806, he was ordained a deacon in the Methodist Episcopal church. He was subsequently regular preacher and presiding elder, and a member of every quadrennial conference from 1816 to 1860, and once more in 1868. He was a zealous worker, in the course of 83 years preaching about 15,000 sermons, and baptizing 12,000 converts. C. was widely known for his homely but powerful preaching; and interesting stories are told of his daring and romantic adventures among the rough back-woodsmen. Many of these can be found in his *Fifty Years a Presiding Elder*, and in the *Autobiography of Peter Cartwright, the Backwoods Preacher* (New York, 1856).

**CARTWRIGHT, Sir RICHARD JOHN**, Canadian statesman, was born at Kingston, Ontario, Canada, Dec. 4, 1835. He was educated at Trinity College, Dublin, and on his return to Canada studied law, but relinquished its practice in order to engage in banking. Having made a very careful study of financial questions he entered public life as a Conservative member of the Legislative Assembly in 1863. In 1870 he joined the Liberal party and held the portfolio of Finance in the Mackenzie ministry from 1873 to 1878. On retiring from office in the last named year, he was made Knight Commander of the Order of Michael and George. As leader of the Liberal party he took an active share in the election of 1891, and aided greatly in cutting down the Conservative majority in the House of Commons. He was the first Canadian statesman of importance to consider the subject of annexation to the United States as a practical question in Canadian politics.

**CARTWRIGHT, SAMUEL ADOLPHUS**, b. Va., 1793; d. May 2, 1863. He studied medicine under Dr. Rush, and graduated at Pennsylvania college. During Jackson's campaigns against the Indians and the British he was surgeon-in-chief, and, after 1815, settled in Alabama, and afterward in Natchez, Miss., where he labored for a quarter of a century. Dr. C. wrote many valuable papers upon fevers, cholera, and other diseases.

**CA'BUS, KARL GUST.**, a German scholar, physiologist, physician, and artist, was b. at Leipzig, 8d Jan., 1789. He first attracted notice by a series of lectures on comparative anatomy, delivered in his native city about the year 1812. After having superintended, during the war of 1813, the French hospital at Pfaffendorf, he went to Dresden, where he was appointed professor of midwifery in the newly organized medico-chirurgical academy, but resigned his office when elected court physician and councillor of state. His house was the rendezvous of all the most distinguished savants and artists in Dresden. C. wrote a vast variety of works, some of which are marked by original and striking views, as, for instance, *Ueber den Kreislauf des Blutes der Insecten*, in which he demonstrates the circulation of the blood in insects. He died in July, 1869.

**CA'BUS, MARCUS AURELIUS**, 222-38; Emperor of Rome; supposed to have been the son of a noble Roman lady and an African father. On the assassination of Probus in 283, C. was proclaimed emperor by the legions. He was victorious over the Sarmatians, and in a winter campaign in Asia, he carried his arms beyond the Tigris. He died very suddenly in camp, and it was given out that he had been struck with lightning.

**CARVAHAL', OR CARBAJAL**, TOMAS JOSÉ GONZALES, 1753-1834; poet and statesman of Spain; educated at Seville. He held a number of offices of importance, and in 1812, became director of the university of San Isidore, where, by establishing a chair of international law he offended the government, and was imprisoned for 5 years. He was reinstated by the revolution of 1820, but forced into exile by the counter-revolution 8 years later. He died a member of the supreme council of war. C. obtained celebrity as the author

of metrical translations of the poetical books of the Bible, and for other works in prose and verse.

**CARVALHO E MELLO.** See POMBAL.

**CARVEL-BUILT.** The difference between the *carvel* and the *clinker* methods of arranging the outer planks in ship and boat building is explained under **CLINKER-BUILT**.

**CARVER**, a co. in s.e. Minnesota, on the Minnesota and Crow rivers; 340 sq.m.; pop. '90, 16,532. Surface undulating, and soil fertile; productions, agricultural. The Minneapolis and St. Louis and the Chicago, Milwaukee, and St. Paul railroads traverse it. Co. seat, Chaska.

**CARVER**, JOHN, b. England, about 1575; d. in Mass. 1621. He left England on account of religious intolerance, and settled in Leyden, whence he was sent to effect certain arrangements with the Virginia company. In 1619 he got a patent, and sailed in the *Mayflower* with 101 colonists. On the landing at Plymouth, Carver was chosen as governor, and managed affairs prudently for the four months between his election and his death.

**CARVER**, JONATHAN, 1732-80; a native of Connecticut; began the study of medicine, but became a soldier, and served in the colonial wars previous to the revolution. After the peace of 1763, and the cession of the Canadas to Great Britain, Carver traveled extensively in the northwestern wilderness, for the purpose of finding new openings for trade, going to England to announce his discoveries. In 1778, he published *Travels through the Interior Parts of North America*, and the next year a treatise on the culture of tobacco. He died in extreme destitution.

**CARVING**, a subordinate branch of sculpture, is usually performed on ivory or wood. Ivory was the favorite material for this purpose in the e. from an early period. Among the Babylonians, who likewise practiced gem-engraving to a great extent, carved heads for staves were executed in vast quantities, as every Babylonian carried a staff and a signet ring. During the palmy days of Grecian art, ivory was largely employed; the nude portion of the colossal statues of the gods being composed of some solid material overlaid with plates of ivory, while the remaining portions were of plate gold. At a later period, ivory was chiefly employed in small works, usually of a decorative character. During the earliest period, statues of the gods were generally of wood, painted, gilt, or draped with colored robes, different kinds of wood being appropriated to different divinities. Carvings in ivory form an important branch of early Christian sculpture. Among the most curious of these are the ivory tablets adorned on the outside with low-reliefs, and in the inside coated with wax for the purpose of writing upon. The chair inlaid with ivory that belonged to archbishop Maximilian in the cathedral at Ravenna, is of this period (546-55). In the year 808, Charlemagne received two richly carved doors as a present from Constantinople, but works of the same kind were executed at a much earlier period. Towards the end of the middle ages, the art of C. in wood was brought to a high degree of perfection in Germany. Altars were adorned with carvings of this material, often of large size, and with numerous figures; in general, the nude portions were carefully and tastefully colored after nature, and the draperies gilt. Specimens are to be seen in the churches at Altenberg, Erfurt, Prague, and in some churches in Pomerania. The finest and most perfect specimens are a series of reliefs relating to the doctrine of transubstantiation in the church at Tribesee. Many of the Belgian churches also possess very beautiful examples of wood-carving. Michael Wohlgemuth of Nuremberg, and after him Veit Stoss, were eminent carvers in wood. The wood-carving on the great altar of the cathedral at Schleswig by Hans Bruggemann belongs to the beginning of the 16th century. Many graceful specimens of wood-carving, on a smaller scale, belonging to this period, are to be seen in museums. Nuremberg was celebrated for its wood-carvings; but only a few of the many works ascribed to him can be assigned with certainty to Albert Dürer. Portrait medallions, usually cut in box, were much in vogue during the early part of the 16th century. The first artist in this line was Hans Schwartz of Augsburg. During the 17th and 18th centuries, we find ivory again extensively employed in crucifixes, crosses, and goblets, with relief representations. The most eminent artist is Franz de Quesnoy.

**CARY**, ALICE, b. near Cincinnati, O., 1820, d. N. Y., 1871. At the age of 18, she began to write for the press, and at the age of 30, with the assistance of her sister Phoebe, she published a volume of verses which were exceptionally popular. In 1851, the sisters removed to New York city, where, under the friendship and patronage of Horace Greeley, they led successful literary and social lives for 20 years. Among the works of Alice, besides many poems, are *Cloverbrook*; *Hagar, a Story of To-Day*; *Married, not Mated*; *Pictures of Country Life*; *Snow Berries*; *The Bishop's Son*; *The Lover's Diary*, etc.

**CARY**, ANNIE LOUISE, b. Wayne, Me., 1842; began her career as an operatic contralto in Europe, 1867; sang in the principal cities of the United States, 1870; made a second prolonged tour of Europe, 1875-7, and sang in the United States till 1882, when she married Charles M. Raymond, and retired from public life.

**CARY**, ARCHIBALD, 1730-86; a Virginian, conspicuous on the patriot side of the revolution, his services being mainly in the Virginia convention and house of burgesses.

When the state government was organized he was chosen president of the senate. The story is told of him that, on hearing a report that Patrick Henry was spoken of for dictator, he said to Henry's half-brother, "I am told that your brother wishes to be dictator. Tell him from me that the day of his appointment shall be the day of his death, for he shall find my dagger in his heart before the sunset of that day." Patrick Henry was the last man in the world to aspire to a dictatorship.

**CARY**, Rev. HENRY FRANCIS, known for his admirable translation of Dante, was b. at Gibraltar, in 1772. At Oxford, where he entered Christ Church as a commoner in 1790, he was early distinguished as a classical scholar, and also for his knowledge of Italian, French, and English literature. In 1805, he translated Dante's *Inferno*, and in 1814, the whole of the *Divina Commedia*, a translation remarkable not only for its accuracy but for its expressiveness and force. He afterwards translated Pindar's *Odes* and Aristophanes's *Birds*, and wrote a series of memoirs, in continuation of Dr. Johnson's *Lives of the Poets*. For some years he held the appointment of assistant-librarian in the British museum, and died in 1844. A memoir by his son was published in 1847.

**CARY**, LOTT, b. a slave in Virginia in 1780, d. in Monrovia, Africa, 1828. Early in life he became a zealous Baptist; redeemed himself and two children from slavery, and in 1821 went to Liberia, where he was concerned in removing the colonists from the unhealthy locality first chosen for their settlement. He did much to advance the welfare of the new republic, and was left in full power when, in 1828, Mr. Ashmun sailed for the United States.

**CARY**, PHOEBE, 1824-71; sister of Alice, also a poetical and prose writer. Most of her works were issued with those of Alice. She d. at Newport, R. I., three months after the death of her sister, with whom she was a life-long companion. Neither of them was ever married. See Mary Clemmer Ames's *Alice and Phoebe Cary* (1878).

**CARY**, Sir ROBERT, son of Henry Cary, lord Hunsdon, was b. in 1559 or 1560, and rose to eminence in the civil service of queen Elizabeth. For a number of years he acted as English warden of the marches. As a courtier, he was present at the death of Elizabeth, 1603, and expeditiously rode on horseback to Edinburgh to communicate the intelligence to her successor, James VI. At the coronation of Charles I., he was elevated to the peerage as earl of Monmouth. At his death without male issue the earldom became extinct. Sir Robert Cary wrote his *Memoirs* (Edin. 1808), a work interesting chiefly from notices connected with border history. He d. in 1639.

**CARYA**. See HICKORY.

**CARYATIDES** (pl. of *Caryatid*, literally, a woman of Caryæ), a name given to female figures, in Greek architecture, when applied instead of columns to support a roof. The traditional account of the origin of the name is, that the inhabitants of Caryæ, a city in Arcadia, having joined the Persians after the battle of Thermopylæ, the Greeks, after their victory over the Persians, destroyed the town, slew the men, and carried the women into captivity. As male figures representing Persians were used for this purpose, it occurred to Praxiteles, and other Athenian artists, that female Caryatidæ, in their national costume, might be thus employed to commemorate the disgrace of their country. Lessing, and various other writers, have treated this account as fabulous; but it seems to be confirmed by a bas-relief preserved at Naples, in which two female figures are represented in the attitude of C., and which has a Greek inscription mentioning the conquest of Caryæ. Male figures used for the same purpose are called Atlantes (q.v.).

**CARYL**, JOSEPH, 1602-73; a non-conformist clergyman, a native of London, educated at Oxford. By order of Cromwell, he attended Charles I. in Holmby house, and in 1650, he was sent with Owen to accompany Cromwell to Scotland. He is remembered for a ponderous commentary on the book of Job, in which, after the fashion of his time, he enlarges on every verse, and almost on every word.

**CARYOCAR**, a genus of large trees of the natural order *rhizophoraceæ*, and almost constituting the whole order. They are all natives of Guiana and Brazil, and are sometimes called *pekea* trees. They yield good timber for ship-building, and produce the delicious nuts, now not uncommon in the London market, called *butter nuts* or *sourari nuts*. The fruit is a sort of drupe, containing several combined nuts. The fleshy part of the drupe consists of a butter-like substance, which melts between the fingers, and is used in cookery instead of butter, on which account these trees are sometimes called *butter-trees*. It forms merely a thin covering for the nuts, the bristles on the outer surface of which, in some of the species, sting like the hairs of the nettle, and are very troublesome to those who open them. The kernels are remarkably soft. An oil is extracted from them which is scarcely inferior to olive oil. *C. nuciferum* is now cultivated in the island of St. Vincent; but *C. butyrosum*, *C. glabrum*, *C. tomentosum*, and other species appear equally worthy of attention.

**CARYOPHYLLACEÆ**, a natural order of exogenous plants, containing upwards of 1000 known species, mostly herbaceous plants, a few half shrubby. The stems are tumid at the articulations; the leaves always opposite and entire, often uniting around the stem. The flowers are regular; the calyx persistent, of 4 to 5 sepals, either free or united into a tube; the corolla of 4 to 5 petals, which are frequently bifid, and generally terminate

in a claw at the base, sometimes wanting; the stamens as many, or twice as many, as the petals; the ovary of 2 to 5 carpels; the stigmas sessile; the fruit is a one-celled capsule, with central placenta, to which the seeds are attached.—The plants of this order are mostly natives of temperate and cold countries; some of them are only found on tropical mountains, near the limits of perpetual snow. Most of them are inconspicuous weeds; some produce beautiful flowers; almost all are insipid and inert; a few contain *saponine*, and afford a substitute for soap. See SOAPWORT. To this order belong the pink, carnation, sweet William, lychnis, chickweed, etc.

**CARYOPHYLLUS.** See CLOVES, MYRTACEÆ.

**CARYOP'SIS**, in botany, a fruit in which the seed and pericarp are so incorporated as to be inseparable, and even undistinguishable. The grain or fruit of grasses, as wheat, barley, rye, maize, etc., is a caryopsis.

**CARYO'TA**, a genus of palms, natives of the East Indies, one of which, *C. urens*, remarkable for the acidity of its fruit, which produces a burning sensation when its pulp is applied to the skin, is also highly valuable for the great quantity of juice (*toddy*) which flows from its wounded spathes, sometimes, in the hot season, to the amount of 100 pints in 24 hours from a single tree. Sugar (*jaggery*) is made from this juice by boiling it down, and on this account this palm is sometimes called the jaggery palm. The pith of old trees, or farinaceous part of the trunk, is also much used for food, and is said to be equal to the best sago. The outer part of the stem is very hard, and applicable to many purposes. The fibers of the leaf-stalks are made into ropes, which are very strong and durable; the leaf-stalks, merely stripped of the leaflets, are used as fishing-rods, being light, tapering, and elastic; and the woolly substance found at their base is sometimes used for calking ships. This palm is found both in India and Ceylon, and abounds chiefly in mountainous districts. It rises to a height of 60 ft., with a trunk of a foot in diameter, and a magnificent spreading head of great double pinnate leaves, and triangular leaflets, the apex of the triangle being their point of attachment.

**CARYSFORT REEF**, off the s.e. coast of Florida, in 25° 18' n., and 80° 18' west. There is a light 106 feet above tide. Navigation is dangerous on account of the proximity of the gulf stream.

**CASA**, the prefix to many names in Italian and Spanish, signifying "house" or "home."

**CASABIAN'CA**, LOUIS, 1755-98; b. at Bastia; an officer in the French navy, and at a later period a member of the national convention; later still one of the council of 500; and finally capt. of *L'Orient*, flag-ship of the fleet that transported Bonaparte and his army to Egypt. In the battle of Aboukir, when the fleet was attacked by the English, Casabianca fought to the last; and, with his son 10 years old, was killed in the blowing up of the vessel.

**CASACALEN'DA**, a t. of Italy, in the province of Campobasso, 17 m. n.e. of Campobasso, on the site of the ancient Calea. Fruits and wine of good quality are produced in the district, where silk-worms are also reared. Pop. 6000.

**CASA'LE**, a city of n. Italy, province of Alessandria, situated on the right bank of the Po, which is here crossed by an iron bridge, 38 m. e.n.e. of Turin. It is a place of considerable antiquity, and occupies the site of a more ancient town. Many Roman remains are found, and coins of the early ages of the republic. It has a cathedral, dating from the 8th c., with valuable archives. The old citadel, founded in 1590, was one of the strongest in Italy, and within recent years the fortifications have been greatly strengthened and extended. During the Italian campaign of 1859, C. was occupied by divisions of the Sardinian army, and for a short time formed the head-quarters of the French emperor. It has manufactures of silk-twist, and a trade in the produce of the district, which is very fertile. Pop. about 27,000. C. formerly gave its name to a province which had an area of about 350 sq. m., and a population of about 143,000.

**CASAL'MAGGIO'RE**, a t. of n. Italy, province of Cremona, on the left bank of the Po, 22 m. e.s.e. of Cremona. Being subject to frequent inundations from the river, strong embankments have been constructed for its protection. It has manufactures of earthenware, leather, glass, etc. Pop. of commune, 16,000.

**CASAMAS'SIMA**, a t. of Italy, in the province of Bari, 14 m. s.e. of the city of that name. It has a convent and two abbeys, and the vicinity produces wine and almonds. Pop. 7,600.

**CASANO'VA**, FRANCIS, a celebrated painter of battles and landscapes, was b. in London, of Venetian parents, 1732. Educated in Italy, he afterwards went to Paris, from which he was driven by the severe criticism of Diderot. C. then took up his abode in Dresden, where he painted chiefly battle-pieces, and by one of his greatest works gained a place in the academy. He afterwards went to Vienna, and painted for the empress Catharine her victory over the Turks. He died in Briel, near Vienna, 1805. The execution, and especially the coloring of his works, are excellent.

**CASANO'VA DE SEINGALT**, GIOVANNI JACOPO, a notable adventurer of the Cagliostro species, was b. 1725, in Venice, and studied in Padua, afterwards in Venice, intending

to enter the church. Having been expelled for sufficient reasons from a seminary of priests, he traveled to Naples, visited Rome, and after many adventures arrived in Constantinople. On his return to Venice in 1745, he supported himself for a time by his skill as a violinist, until he gained some celebrity by curing a senator who had been attacked by apoplexy. His irregularities again drove him from Venice. He now wandered about for some time among the chief cities in the n. of Italy, Milan, Mantua, Verona, Ferrara, Bologna, Parma, etc., but in 1750 he proceeded to Paris, where he was patronized by the nobility, and became acquainted with several eminent authors. It is needless to mention in detail his endless, inexplicable peregrinations. He visited almost every European capital, was somehow introduced to the best company, invariably excited the disgust or ill-will of those who knew him, and had always to "vanish" after a brief period of enjoyment. In 1761, we find him distinctly professing the miraculous after the Cagliostro fashion: he having undertaken to regenerate old Madame D'Urfé into a young man—for a consideration! He died in Bohemia in 1798. His celebrated memoirs, *Mémoires écrites par Lui-même* (12 vols., Leip. 1826-38), contain many interesting notices of the manners of his times, intermixed with details of his personal adventures.

**CASAREEP**, or **CASSIRIPE**, a sauce or condiment made from the juice of the bitter cassava or manioc root. It is in the highest esteem in Guiana, where it is employed to flavor almost every dish; and it is the basis of the favorite West Indian dish called *pepper-pot*. It is a powerful antiseptic, and meat can by means of it be kept for a long time quite fresh, even in a tropical climate. It is made by evaporating and concentrating the juice, which is also mixed with various aromatics. The poisonous principle of the juice is dissipated in the evaporation, so that although the juice in a fresh state is readily fatal to life, the C. is perfectly safe and wholesome. C. is imported into Holland and Britain, and remains unimpaired in quality for several years.

**CASAS GRANDES** (the "great houses"), a t. in Chihuahua, Mexico, 150 m. n.w. of the city of Chihuahua, celebrated for the ruins of early Mexican buildings still to be seen. These ruined houses are built of sun-dried bricks of mud and gravel, each brick about 22 in. thick and 8 ft. in length. The walls, which are in some places 5 ft. thick, seem to have been plastered both outside and inside. The main edifice, about 800 by 200 ft. in extent, is rectangular, and appears to have consisted of three separate piles united by galleries or lines of lower buildings, and the ruins indicate a height for the main staircase of six or seven stories. In the same vicinity are artificial mounds from which have been excavated stone axes, corn-grinders, and various other utensils. Similar ruins are found near the Gila, the Salinas, and the Colorado rivers.

**CASATI**, GAETANO, b. Italy, 1838; was in the Piedmontese army 1859-79; went to Africa under the Italian society for commercial exploration, 1879; explored the basin of the Bahr-el-Ghazal; joined Emin Pasha, 1883; was captured by Kabrega, 1886, and released by Stanley, 1889; and besides reports published *Dieci Anni in Equatoria* (1891).

**CASAUBON**, ISAAC DE, a great scholar and critic, was b. Feb. 18, 1550, at Geneva, where, in 1582, he was appointed professor of the Greek language. Subsequently he held professorships at Montpellier, 1596, and at Paris, 1598, but the death of Henry IV. rendered his position (C. being a Protestant) very insecure, and he therefore gladly accepted the offer of sir Henry Wotton to visit England. King James received him with distinction, and appointed him some time after prebendary of Canterbury and Westminster. He died in London, July 1, 1614. His acute investigation and criticism were applied to several branches of archaeology and theology. Among his chief works may be mentioned the able dissertation, *De Satirica Græcorum Poësi et Romanorum Satira* (1605); the treatise *De Libertate Ecclesiastica* (1607); and the *Exercitationes contra Baronium* (1614), a confutation of cardinal Baronius. His critical and exegetical works include editions of Diogenes Laertius, Aristotle, Theophrastus, Suetonius, Persius, Polybius, Theocritus, Strabo, etc.—See *Isaac Casaubon*, by Mark Pattison (1875).

His son, **MERIC CASAUBON**, was b. at Geneva, 14th Aug., 1599; educated first at Sedan, he accompanied his father to England, and entered Christ Church college, Oxford, where he took his degree of M.A. in 1621. He was appointed rector of Ickham, near Canterbury, 1628, and afterwards professor of theology at Oxford. He died at Oxford, July 14, 1671. His attachment to Charles I. deprived him of all his preferments during the commonwealth, but at the restoration he received them again. Meric was, like his father, distinguished for his erudition; edited the works of Marcus Aurelius Antoninus, Terence, Epictetus, etc.; and wrote a treatise, *De Enthusiasmo* (Lond. 1655).

**CAS'BIN**, or **KAZVIN**, a t. of Persia, in the province of Irak-Ajemi, 90 m. w.n.w. of Teheran. It is situated on an extensive plain of the same name, and is inclosed by walls. Before the time of Shah Abbas the great, C. was for a brief period the capital of Persia. The plain affords good pasturage, and in the vicinity of the town are extensive vineyards and orchards. The town is very extensive, but a great part of it is now in ruins, owing to its frequent subjection to earthquakes; and the population, which at one time was estimated at 200,000, is now probably not much in excess of 25,000. Some velvets, brocades, and coarse cotton cloth are manufactured; and C. has also a considerable trade in raw silk, rice, etc.



**CASCA**, PUBLIUS SERVILIUS, the one among the assassins of Julius Cæsar who, according to Plutarch, struck the first blow. This was done across the back of Cæsar's neck with a short sword, but the wound was not deadly, and the finishing of the work was left to Brutus and the others.

**CASCADE**, a co. in Montana ; 2600 sq.m. ; pop. '90, 8755. Co. seat, Great Falls.

**CASCADE RANGE** in Oregon and Washington ; name of a mountain chain forming a continuation of the California coast range. The mountains are about 100 m. e. from the Pacific, and the more conspicuous peaks are Mts. Baker, Jefferson, Wood, Pitt, and Tacoma, the latter the highest point—14,444 ft. above tide.

**CASCARA**. See CASCARILLA.

**CASCARILLA** (i.e., little bark, from Span. *cascara*, bark), the name given in South America to many different kinds of bitter medicinal barks which form articles of commerce. Peruvian bark itself bears no other name in the districts which produce it ; and the name C. has recently been introduced into medicine, of the bark of *Croton eleuteria*. It is a tonic, invigorating digestion, and promoting the functions of the stomach.

**CASCO BAY**, an indentation of the s.w. coast of Maine, about 20 m. wide, n.e. of cape Elizabeth, near Portland. The bay contains hundreds of small islands.

**CASE**, in grammar. See DECLENSION.

**CASE**, in law, primarily means a cause—that is, an action or suit taken as a whole. It has been said that the word "case" is more generally used with a broader meaning than "cause," as referring to actions both at common law and in an equity court. The word is used in its general sense in the United States Constitution, which extends the judicial power of the United States to "cases in law and equity, cases affecting ambassadors, etc." In a more limited sense, a case is one side of a suit or action—the body of evidence and law presented by one of the parties. The word also denotes a decision or dictum of the court already recorded and cited in argument ; so the phrase *case law* is used to designate the species of legal argument founded in the citation of cases ; hence also the phrase *leading cases*, meaning important decisions having a wide application and setting forth general principles which may govern many subsequent decisions. In the United States the term "Case" is often used in brief for *case on appeal*, meaning the statement laid before a court of appeal by an appellant and presenting the entire evidence in the original trial ; thus allowing the appellate court to review the findings of the jury as well as the law points involved, and differing in this from the bill of exceptions, which presents to the court of appeal law points only. *Case agreed on* or *case stated* is a statement in which both parties to a suit unite in laying the facts of the case in which they agree before the court for a decision on the points of law involved. *Case reserved* is a statement drawn by counsel and certified to by the Judge to be laid for argument on law points before a full bench of the court. A very important form of action is sometimes called *case*, in brief for *action on the case*, or still more fully *action of trespass on the case*. This was designed to remedy certain defects in the common law practice which failed to provide an adequate remedy for some classes of injuries. The phrase "action on the case" is really equivalent to "action on the circumstances," and this form of suit avails when it is sought to require damages for personal injuries not accompanied by violence, or where the subject in dispute was of such a kind that the injury was indirect or consequential. Thus where the wrong committed by the defendant lies in neglecting to do something which the relations of the party make his legal duty, action on the case for damages would lie. This form of action has been generally incorporated into the codes of legal procedure adopted by many of the United States, and still remains in constant use. In Great Britain the Judicature Acts have so classified injuries for which damages may be sought as in general to make this form of action obsolete.

**CASE**, in letter-press printing, a receptacle for types, generally made 84 in. long, 15 in. broad, and 1½ in. deep, and divided into compartments or "boxes," each of which contains types of one class or letter. A pair of cases consists of an upper and a lower case : the upper one has 98 "boxes," and contains the capitals, small capitals, and some other letters that are only occasionally required in composition ; the lower one has 58 "boxes," and holds the letters of the small character, figures, spaces, and most of the points. The places assigned to the several letters of the alphabet in the boxes of the case are not precisely the same in all printing-offices, but the differences are few. When in use, the cases lie on a frame 4 ft. high, and the compositor stands in front of them. The different sizes of the boxes in the lower case depend upon the comparative frequency in which the several letters occur in composition, and the position in the case allotted to each letter is such as to afford the greatest facility in composing. The letter e, which is most run upon in the English language, has a box much larger than any of the other compartments, and is placed directly in front of the compositor. In the upper case the boxes are of uniform size, and the letters are placed in alphabetical order, the comparatively rare occurrence of capitals rendering it immaterial which letter is nearest the compositor's hand. A case will hold a quantity of "letter" sufficient to "set up" three pages of this work, which is equal to 18,000 types.

**CASE-HARDENING** is the process of converting the surface of certain kinds of malleable-iron goods into steel, thereby making them harder, less liable to rust, and capable of taking on a better polish. Fire-irons, portions of fine grate-fronts, gun-locks, and other articles of limited size, are very commonly so treated, but the process is sometimes applied to large objects, such as iron railway-bars. The articles are first formed of bar-iron, and being heated to redness, are sprinkled with a little powdered yellow prussiate of potash, and heated again. The result is, that the heat decomposes the prussiate of potash, and the liberated carbon combines with the iron, forming a coating of steel on the surface of the articles. Another mode of case-hardening is to heat the articles along with some animal matter, such as the parings of horns and a little common salt, from one half to several hours; the articles are then cooled in cold water, or in oil, when they are of a delicate nature. Charcoal alone is also employed. The coating of steel is very thin, seldom exceeding  $\frac{1}{16}$ th of an inch. Where it is wanted to be thicker, the articles are treated several times. A Swedish iron-master has found that a very excellent case-hardening is obtained by treating iron objects with a mixture of animal matter and arsenious acid dissolved in hydrochloric acid, and heating as usual.

**CASEINE**, or **CASEUM**, is an organic compound allied to albumen (q.v.), found in the milk of the mammalia, and in pease, beans, and other leguminous seeds, when it receives the name of **LEGUMINE**. The proportion of C. in milk (q.v.) varies, but averages about 8 per cent, and it may be coagulated and separated therefrom by the addition of a little rennet (q.v.), as in the manufacture of cheese (q.v.), or by the employment of a few drops of a mineral acid, such as dilute sulphuric acid. In either case, the C. separates as *curd*, which still retains attached to it some oil and earthy salts, though the greater portion of these substances, along with the sugar, remains in the watery liquid or *whey*. The elementary bodies which enter into the composition of C., and the proportion in which these are present in 100 parts, are—carbon, 58.83; hydrogen, 7.15; nitrogen, 15.65; oxygen, 22.52; and sulphur, 0.85. The properties of C. are, that it is not coagulated by heat, as is well evidenced in the heating of milk, but is coagulated on the addition of rennet; sulphuric, hydrochloric, or nitric acids; alcohol, creosote, or infusion of galls, but not by acetic acid. It also forms insoluble precipitates with solutions of the poisonous salts, acetate of lead, nitrate of silver, and bichloride of mercury (corrosive sublimate), and hence the efficacy of taking large doses of milk in cases of poisoning by those deadly salts, as the C. in the milk, forming an insoluble compound with the poison, keeps it from exerting its deadly powers.

The form of C. obtained from plants, and termed *legumin*, is generally procured from leguminous seeds, like pease or beans, though it can also be extracted from the majority of vegetable substances, especially from sweet and bitter almonds, and even from tea and coffee. Dried pease contain a fourth of their weight of *legumin*, and this can be extracted by bruising the pease to powder, and digesting in warm water for two or three hours. The liquid is then strained through cloth, which retains the insoluble matters, and allows the water with the *legumin* dissolved therein, and with starch mechanically suspended, to pass through. On settling, the starch falls to the bottom of the vessel, and the clear liquid holding the *legumin* in solution, on the addition of a small amount of acetic acid, yields a precipitate of *legumin* or vegetable *Caseine*. So perfectly does the vegetable C. resemble the C. from milk, that the one can hardly be distinguished from the other by chemical tests or by taste; and at the present time there is regularly prepared in various parts of China, especially near Canton, a form of cheese from pease, which is sold to the populace in the streets of Canton under the name of *taofoo*. C. is a most important article of food. See **NUTRITION**.

**CASEMATE**, originally a loop-holed gallery excavated in a bastion, from which the garrison could do execution upon an enemy who had obtained possession of the ditch without risk of loss to themselves. Hence the designation, from Span. *casa*, house, and *matar*, to kill. As defense from shells became more important, the term was subsequently applied to a bomb-proof vault in a fortress, for the security of the defenders, without direct reference to the annoyance of the enemy. A *casemated* battery consists of such a vault or vaults, with openings for the guns. A C. may also serve for barracks, or for an hospital, or for a store-house. The great want of ventilation in *casemates* renders them bad places for barracks; and the artillerymen are nearly stifled with smoke when firing from such confined places.

**CASEMENT** (It. *casamento*, a large house), a frame with hinges to open and shut, closing part of the glazing of a window. Windows of this description are rare in this country, but are almost universal on the continent. Also a name for a deep, hollow, circular molding, similar to the *scotia* of classical and the *cavetto* of Italian architecture. The C. is very prevalent in the perpendicular style of Gothic architecture, and is sometimes enriched with running foliage.

**CASERNE** is a barrack or building for the accommodation of the soldiers forming the garrison of a fortified town or post.

**CASERTA**, a t. of Italy, in the province of the same name, is situated on a plain about 17 m. n.e. of Naples. It is chiefly remarkable on account of its magnificent palace, one of the finest in Europe, and formerly the frequent residence of the Neapolitan court.

During 1860, C. acquired celebrity as the head-quarters of Garibaldi and his army. A royal silk manufactory has been established in the neighborhood. Population of commune, Dec. 31, 1894, 85,600.

**CASE-SHOT**, or **CANISTER-SHOT**, is an assemblage of bullets or small balls, inclosed in a cylindrical case or canister. The diameter of this canister is a little less than the bore of the gun from which it is to be discharged. According to the size of the canister, the balls vary from 1 lb. to  $\frac{1}{4}$  oz. each, from 80 to 280 in number, and from  $3\frac{1}{4}$  lbs. to 85 lbs. in total weight. The canister bursts immediately on leaving the gun, and the balls spread out into an irregular sort of cone. Within a range of 500 yards they work great execution among troops; they are generally used at 200 or 800 yards.

In a more modern and effective kind, called *spherical case*, the bullets are inclosed, along with a charge of powder, in an iron shell, instead of a tin canister. It is often called *shrapnel shell*, from the name of its inventor. A spherical case-shot for a 68-lb. carronade, or for an 8-inch howitzer, contains 387 balls; for a 24-pounder gun, 128; and for an 18-pounder, 90. It is exploded by a fuse, the length of which depends on the distance of the point where the destructive effect is to be wrought. Its effect is something like that of a prolonged musket-fire. The shrapnel shell is not of much use against the hull of a ship; but is very destructive against masses of men on shore, or on the decks of a ship, with a greater range than that of ordinary canister. Artillerymen prefer just such an amount of charge as will burst the sphere, without scattering the balls very widely.

**CASEY**, a co. in central Kentucky, on Green and Salt rivers; 444 sq.m.; pop. '90, 11,848, with colored. It has a rough surface and produces grain, tobacco, butter, and wool. Co. seat, Liberty.

\* **CASEY**, THOMAS LINCOLN, 1831-96; b. Sacketts Harbor, N. Y.; military engineer. He graduated at the U. S. military academy, and entered the engineer corps of the army, 1852; became chief of engineers, and brigadier-general 1888; and, as superintending engineer of public buildings and grounds in the District of Columbia, had charge of the Potomac aqueduct, the completion of the Washington monument, and the State, War, and Navy departments building, and the construction of the Medical Museum and library.

**CASH ACCOUNT**, or **CASH CREDIT**, a form of account with a bank, by which a person is entitled to draw out sums as required by way of loan to a stipulated amount. The practice began about 1729 in Scotland, with the banks of which country it is still peculiarly identified; but it is not unknown elsewhere, though on a somewhat different plan. In connection with the Scotch banks, the C. A. system is placed on a distinct and secure basis, which we shall briefly describe. The persons procuring a credit of this kind are for the most part retail-dealers, tradesmen, and farmers, who possess a limited capital, and need occasional loans. Instead of borrowing money by bills or mortgages, they apply to a bank for a C. A. to the extent, it may be, of £500. In the origin of the system, the bank may be said to have been influenced by three considerations—first, the necessity for making advantageous use of its capital; second, the desire to extend its issues of small notes; and third, the nature of the security offered. Since sir Robert Peel's act restricting circulation of notes, the second of these reasons no longer operates; for the banks are now much above their authorized issue, and must hold an equal amount of coin against the surplus. What the bank particularly wants, is a customer who will be constantly depositing sums in notes of other banks, and drawing out sums in its own notes. The C. A. system aids this process. It secures a customer who will be frequently operating on his account, according to the exigencies of his business, and whose overdrafts, as well as deposits, tend to benefit the concern. Obviously, for the debtor, the system works more advantageously than when a fixed sum is borrowed, for in that case interest would run on for the whole amount, whereas by a C. A. the trader merely draws what he requires; and by paying in his surplus money in small sums, he is charged with interest only on the sum actually at his debit from day to day. In negotiating a C. A., a bond is prepared by the bank stating the amount and the nature of the security, the cost of which is borne by the borrower. Banks often, in security, accept heritable property and policies of life insurance, but more commonly two persons in good credit become cautioners, or co-obligants along with the principal. Unless the liability of the cautioners respectively be expressly limited in the bond, each is liable for the whole amount. If the bank liberates one cautioner without the consent of the other, it loses its recourse. This recourse is not lost by accepting a dividend from the sequestered (bankrupt) estate of a principal or cautioner; but it will be lost by accepting a composition from either of these persons without consent of the other. The bank can at any time stop the credit, and call for payment of the balance due. A cautioner can at any time withdraw his name from the credit, on paying up the balance, and the bank is bound to assign the debt to him. While cash accounts may be of great service to traders who act upon them discreetly, it is found that, in too many instances, these accounts are used as a dead-loan to the entire amount stipulated for; and for this, as well as a reason above assigned, banks care now very much less for this kind of business than formerly. Properly, traders are to look on the money procured on cash credits not as an addition to capi-

tal, but merely a temporary substitute for current business purposes while the capital is out with customers, and to be replaced accordingly until again required. It may be added that the progress of commercial wealth in Scotland now greatly lessens the necessity for having recourse to C. A. system. See MARGINAL CREDIT.

**CASHEL**, a t. of Ireland in Tipperary co., and 105 m. s.w. of Dublin by rail. It is irregularly built on the s. and e. slopes of an isolated height, rising abruptly from a rich and extensive plain, two miles e. of the river Suir. Pop. about 3,500. C. is a Roman Catholic archdiocese. The ancient kings of Munster resided here. The top of the height, or "Rock of Cashel," is occupied by an assemblage of the most interesting ruins in Ireland, which have a grand effect from the country around. The ruins consist of a cathedral, the largest and most remarkable in the country, founded 1169, burned 1495, and afterwards repaired; a stone-roofed chapel, built 1127 by Cormac McCarthy, king of Munster, and the most perfect specimen of the kind in the country; Hore abbey, founded 1260; the palace of the Munster kings; and a round tower, 90 ft. high and 66 in circumference. The round tower is built of freestone, but the other ruins of limestone. At C., in 1172, the great synod was held in which the Irish prelates first acknowledged the authority of the English king and church.

**CASHEW' NUT**, *anacardium occidentale*, a tree of the natural order *anacardiaceae*, a native probably of the tropical parts of both hemispheres, although it has been commonly regarded as of American origin. It is a spreading tree of no great height. It abounds in a clammy, milky juice, which turns black on exposure to the air, and is used in India for varnishing, but is so acrid as to produce painful inflammation when it comes in contact with the skin of some persons, or when they are exposed to its fumes. Others are apparently unsusceptible of its influence. The fruit of this tree is a kidney-shaped nut about an inch long, seated on the thicker end of a pear-shaped fleshy stalk, from which the botanical character of the genus is derived. The shell is double, the outer shell being ash-colored, and very smooth; and between it and the inner is a layer of very caustic black juice. The kernel is oily, and very pleasant and wholesome, and is in common use as an article of food in tropical countries, being made into puddings, roasted, and in various ways prepared for the table. In the West Indies, it is put into wine, particularly old Madeira wine, to which it is thought to communicate a peculiarly agreeable flavor, and for this use it is sometimes imported into Britain. It is also for the same reason sometimes an ingredient in chocolate. Yet the vapor which arises from it in roasting, but which is derived from the coating of the kernel, and not from the kernel itself, is so acrid as to cause erysipelas and other painful affections of the face in those who conduct the process, unless great caution is used.—The fleshy stalk, sometimes called the *cashew apple*, varies in size, being sometimes not much larger than a cherry, and sometimes as large as an orange, and is white, yellow, or red. It is perfectly free of the acidity characteristic of the natural order, is acid and eatable, very pleasant and refreshing, and much used by the inhabitants of the countries in which the tree grows. A very pleasant vinous liquor is obtained from it by fermentation; and this by distillation yields a spirituous liquor, highly esteemed for its flavor. A gum which exudes from the bark of the tree, quite distinct from the milky juice already mentioned, is bland, and very similar to gum-arabic.

\* **CASHGAR**, or **KASHGAR**, the capital of the province of Sin Kiang in eastern Turkistan. C. stands 140 m. n.w. of Yarkand, in lat. 39° 25' n., long. 73° 57' e. It is a point of considerable strategic importance, being at the junction of roads leading to India, Russia, and Peking. It has manufactures of cotton, gold and silver cloths, carpets, etc.; and an extensive trade with Central Asia. Pop. estimated at 50,000. It was connected with Peking by telegraph line in 1894. C. is said to have been an important commercial town before the Christian era, and was possessed for about a century by the Chinese. See TURKISTAN.

**CASHIERING** is a punishment for officers in the army and navy. It is a severe form of dismissal from the military service, and implies that the officer, by some disgraceful conduct, has deserved not only dismissal, but disqualification for ever again entering the service. Sometimes there are words added implying still deeper ignominy and degradation. On some rare occasions, when a court-martial has awarded C., the commander-in-chief has mitigated the punishment to simple dismissal. "Scandalous and infamous conduct," and "conduct unbecoming the character of an officer and a gentleman," mark two degrees of offense which may lead, the one to C., the other to dismissal.

**CASHMERE**, a valley of the Himalaya, between India proper and middle Thibet, stretching between lat. 33° 15' and 34° 35' n. and long. 74° 10' and 75° 40' e. Its bottom, a comparative level of about 2000 sq. m., is 5500 ft. above the sea; while the inclosure, as a whole, from ridge to ridge, besides fully doubling the area, attains, at some points, nearly thrice the altitude. The mountain-wall of this secluded region presents but few passes, and most of these too lofty to be practicable in winter. In fact, the Baramula itself does not admit a wheeled vehicle. Through this single opening, situated at the s.w., the Jhelum carries down towards the Punjab the gathered streams and lakes of the entire basin, and is navigable for the last 70 m. of its course. This net-work of waters, without swelling into inundations, affords everywhere a perennial supply for the purpose of irrigation. Besides the copious rains of spring, the snows of winter covering

even the plains to a depth of two feet for four months, accumulate, in every gorge and on every declivity, reservoir above reservoir, against the demands of summer. C. is traditionally believed to have been a vast upland lake, and alluvial deposits beyond the reach of existing influences would seem to confirm the idea.

In regard to climate, moderate but steady frost prevails from Nov. to Mar.; and again, the heat, ranging from 75° F. in June, to 85° in August, is often disproportionately oppressive, through the stagnation of the landlocked atmosphere. The staple production is rice, which, from the singular facilities of irrigation, is an all but sure crop, yielding, even in a tolerable season, 30 or 40 returns; and in the abundance and excellence of its fruits, C. is said to surpass all the rest of the world. The valley is, in general, considered to be remarkably healthy. The inhabitants, almost universally held to be models of strength and beauty, amounted, before 1828, to 800,000, or to 400 in a sq. mile. The people are mostly Mohammedans, divided between the Sunnite and Shiite sects. The Hindus in 1891 numbered 691,800. The manufactures—all superior of their kind—are shawls, leather, fire-arms, and attar of roses. The principal towns are Serinagur, Islamabad, Shupayon, Pampur, and Baramula. The history goes back, through colossal monuments chiefly of marble, beyond the dawn of authentic annals. In 1315, C. first received Mohammedanism; in 1586 it was annexed to the Mogul empire; in 1752 it fell under the power of the Afghans; and in 1819 it was subjugated by the Sikhs. Lastly being ceded, at the close of the first war of the Punjab, to the British, it was by them transferred to Gholab Sing, as the nucleus of a state of its own name, which comprised also Jamu, Bulti, Ladakh, Chamba, etc. Since 1889 it has been under British administration. Area of principality, 80,900 sq. m.; pop. '91, 2,543,952.—C. or Srinagar, the capital, lies on the Jhelum, about the center of the valley.

**CASHMERE GOAT**, a variety of the common goat, remarkable for its very long, fine, and silky hair, from which the highly valued Cashmere shawls are made. It is not so much in Cashmere that this variety of goat is to be found, as in Thibet, from which the finest goat-hair is imported into Cashmere, to be there manufactured into shawls. The hair is even longer than that of the Angora goat, and not, like it, curled into ringlets, but straight. It is about 18 in. long. A single goat does not yield more than three ounces, and the fleeces of ten goats are requisite for the manufacture of a shawl a yard and a half square. The hair is spun by women, and dyed after it is spun. It is said that 16,000 looms are kept in constant employment in Cashmere, producing annually about 80,000 shawls. The shawls are woven in rudely constructed looms, a pair of shawls sometimes occupying three or four men a whole year in weaving. C. shawls, of the finest quality, are sold in London at from £100 to £400 each. Plain shawls are simply woven in the loom, but those with variegated patterns are worked with wooden needles, a separate needle being used for each color. These shawls are in the highest request in India; but the hair of several other breeds of goat inferior to that of Thibet is employed for the manufacture of shawls called by the same name. Imitations of these are manufactured in France rather extensively, some from the Thibet wool entirely, and others of a mixture of this with silk and cotton. It is said that 24 lbs. of the best Thibetan goat-hair sell in Cashmere for 20 rupees, or \$50.

Attempts have been made to introduce the C. G. into Europe. Baron Alstroemer attempted, in the end of last century, to naturalize it in Sweden; and a very spirited attempt to introduce it into Britain has recently been made by Mr. Towers. A mixed race, produced by crossing the C. G. and the Angora goat, has been found to possess most valuable qualities, the hair being long, fine, and more abundant than in any of the parent breeds.—The male of the C. G. has very large, flattened, wavy horns.

**CASIA**, or **POET'S CASIA** (*onyris alba*), a shrub of the natural order *santalaceae*, a native of the s. of Europe, 3 to 4 ft. high, with linear-lanceolate deciduous leaves, long supple branches, numerous small white flowers, and red drupes (stone-fruit) of the size of a pea. The branches are used for making crates. The shrub has been much admired for its modest beauty. Keats speaks of

"The drooping flowers  
Of whitest casia, fresh from summer showers."

**CASIMIR**, properly Kazimierz, was the name of many Polish princes and kings. With the establishment of the power of Casimir I. in 1040, the predominance of Christianity was decided in Poland. But the most distinguished of this name was Casimir III., called Casimir the great, b. 1309, succeeded his father, Vladislaus Loketek, as king of Poland in 1333. He added little Russia and Red Russia to his dominions; repelled the Tartars, who then threatened Poland; and waged successful war in Silesia, which he conquered but did not retain. He showed great anxiety for the advancement of the arts and of learning in his kingdom, and for the improvement of the condition of the most oppressed classes, which won him the title of king of the peasants. A Jewish mistress obtained from him liberties for the Jews, which they have since retained in Poland. He died in consequence of the falling of his horse in 1370.

**CASIMIR I.** (see **CASIMIR**), b. 1015, "the peaceful," son of the Polish king, Miecslas II., and a German princess named Rixa. The mother endeavored to rule during

C.'s minority, but was compelled to fly to Germany, her son following her and leaving Poland in anarchy. In 1040, C. was called upon by his country, and, with the help of the German emperor, established his authority, drove out the plundering Bohemians, and earned the name of "the restorer." He left a moderately well organized government to his successor. He died 1058.

**CASIMIR II.**, surnamed "the just," 1188-94; one of the four sons of Boleslas, king of Poland, and ruler over the reunited kingdom after the expulsion of Miecislav III. in 1177. Under C. II. the first Polish senate was organized, and laws were enacted defending the peasants against the oppression of the nobles.

**CASIMIR IV.**, 1427-92; brother and successor, as king of Poland, of Ladislas III. He reigned 48 years; waged successful wars against the Teutonic knights; kept his country for most of the time in peace and prosperity; and introduced Latin into schools and official business. Of his six sons, three succeeded each other on the throne, one became king of Hungary and Bohemia, one was a cardinal, and one was canonized.

**CASIMIR-PÉRIER**, JEAN PAUL PIERRE, fifth President of the third French Republic, was born in 1847 of distinguished ancestry. He served as a volunteer in the defense of Paris against the Germans in 1871, and in 1874 was elected to the Chamber of Deputies. After serving as Under Secretary of State in the Department of Public Instruction, he became in 1888 Under Secretary for War, and in 1890 President of the Chamber of Deputies. In December, 1893, he was appointed Premier by President Carnot, on whose assassination, in 1894, he was elected President of the Republic (July 7). Owing to the conflict of factions among the Deputies, he resigned Jan. 15, 1895.

**CASINO**, an Italian diminutive of *casa*, a house, signifies a place for social reunions. The Italian nobles have long had casinos detached from the palaces in which they live, whither they can retreat and enjoy themselves, and it is probable that the *public* casinos were the result of an attempt made by the middle classes to imitate their superiors. In Italy, a C. is generally close by a theater, and is a place where musical or dancing soirees are held, containing a conversation-room, billiard-room, and café.

**CASINO**, or MONTE-CASINO, a mountain overhanging the town of Cassino (the ancient Casinum), in the Italian province of Caserta, between 50 and 60 m. n.n.w. of Naples, is celebrated on account of the monastery founded here by St. Benedict (q. v.) in 529 A.D. This monastery is remarkable for its noble architecture, its ancient wealth, its library and archives, and in modern times for the learning of its monks, who have a printing-press, from which several important works have issued. The beautiful situation of the abbey, and the reputation of the monks as masters of the healing art, formerly made Monte-Casino a favorite resort of pilgrims. See Luigi Tosti, *Storia della Badia di Monte-Casino* (1841-8), giving an account of the literary treasures in the library of the abbey. Pop. of the commune of Casino, about 13,000.

**CASOLI**, a t. of Italy, in the province of Abruzzi and Molise, situated on a hill 21 m. s. of the city of Chieti. Pop. between 5,000 and 6,000.

**CASORIA**, a t. of Italy, 5 m. n.n.e. from Naples. Silk is produced in the district. Pop. about 10,000.

**CASPIAN SEA**, an inland sea or great salt lake, the largest in the world, on the boundary between Europe and Asia, extending from lat. 36° 40' to 47° 20' n., and long. 46° 50' to 55° 10' east. Its length from n. to s. is about 700 m., and its average breadth about 200 miles. Its total area is estimated at 180,000 sq. miles. The coast-line is irregular, and on the e. side especially there are several bays and indentations of coast, the principal being those of Mertvoi, Mangushlak, Kenderlinsk, Karabugos, and Balkan. From the w., the naphtha-impregnated peninsula of Apsheron stretches into the C. opposite the Balkan gulf; Mt. Caucasus also rises on its w. side. On the s. rises the lofty range of the Elburz mountains, between which, however, and the coast, on this side almost unbroken, extends a low flat plain of from 15 to 20 m., in breadth. On the n., it is bordered by great steppes, and the country eastward is a vast plain. It is probable that at one time its waters, which are said to be still diminishing, covered great part of the adjacent steppes. Some singular changes appear to take place in the level of the Caspian. Various measurements have made its depth and elevation different. One Russian measurement made it 848 ft. below the level of the Black sea, another only 84 feet. The latter is confirmed by maj. Wood (*The Shores of Lake Aral*, 1876). It has no tides, but its navigation is dangerous because of violent storms, especially from the s.e., by which its waters are sometimes driven for many miles over the adjacent plains. The depth near the southern end, is about 600 ft., and in some places near the center it attains a depth of nearly 3,000 ft.; but near the coast it is very shallow, seldom reaching a depth of more than 8 ft. at 100 yards from the shore, and in many places a depth of 12 ft. is not reached within several miles of the beach. On the n.e. and e. it is especially shallow. It receives the waters of a number of large rivers, of which the greatest is the Volga. The Ural, the Terek, the Kur, and the Atrek also fall into it. The water of the C. S. is salt, but much less so than that of the ocean. Its northern parts are covered with ice during winter. It abounds in fish, and very valuable fisheries are carried on, especially for sturgeon and salmon. By a canal uniting the head-waters of the Volga with the rivers Tvertza and Schlina, the

C. is united with the Baltic sea. The sea is now surrounded on three sides by Russian territory, the southern shore still remaining Persian. The Russians have a fleet stationed upon it, and the most of its commerce is in their hands. Steam packets have been established on it. The chief Russian town upon its shores is Astrakhan; less important are Petrovsk, Derbend, Guriev, Baku, Krosnoi-yar, and Mikhailovsk, the head of the Transcaspien railway. Balfrush, Reshd, and Astrabad are Persian towns. The practicability of making the Amu-Daria (see Oxus) now running into the sea of Aral, again an affluent of the C. S., has recently been much debated.

The C. S. was known to the Greeks and Romans; according to Strabo, it derived its name from the Caspil, a tribe inhabiting its western shores. The name Caspien was afterwards limited to the western portion of the lake—the eastern being designated the Hyrcanian sea.

**CASQUE.** See **HELMET**.

**CASS**, a co. in w. Illinois, on the Illinois river, intersected by three railroads: 360 sq. m.; pop. '90, 15,968. The surface is level prairie and woodland; and the soil is very fertile, producing corn, wheat, oats, etc. There are also a number of manufactories of flour, lumber, paper and carriages. Co. seat, Virginia.

**CASS**, a co. in n.w. Indiana, on Wabash and Eel rivers, traversed by the Wabash and Erie canal and several railroads; 420 sq. m.; pop. '90, 81,152. With the exception of bluffs near the rivers, the surface is almost level prairie and forest, producing cereals, butter, wool, etc. Co. seat, Logansport.

**CASS**, a co. in s.w. Iowa, on the tributaries of Nodaway river, and intersected by the Chicago, Rock Island and Pacific railroad; 576 sq. m.; pop. '90, 19,645. It is in an agricultural region. Co. seat, Atlantic.

**CASS**, a co. in s.w. Michigan, on the Indiana border, traversed by the Lake Shore and Michigan Southern, the Chicago and Grand Trunk, and the Michigan Central railroads; 504 sq. m.; pop. '90, 20,953. The surface is level prairie, with oak openings, and dense forests. Iron and limestone are found. Other productions are mainly agricultural, and there is considerable manufacturing business. Co. seat, Cassopolis.

**CASS**, a large co. in n. central Minnesota, partly bounded by the Mississippi river; 2990 sq. m.; pop. 1890, 1247. There are numerous streams and a great number of large and small lakes. The northern Pacific railroad passes through the s. part.

**CASS**, a co. in w. Missouri, on a branch of Osage river, and in part crossed by the Pacific railroad of Missouri; 688 sq. m.; pop. '90, 23,801, incl. colored. Surface mostly prairie; productions agricultural. Co. seat, Harrisonville.

**CASS**, a co. in s.e. Nebraska, on the Platte and Missouri rivers, intersected by the Burlington and Missouri Pacific railroads; 530 sq. m.; pop. '90, 24,080. The surface is chiefly prairie, well watered and fertile; productions agricultural. Co. seat, Plattsmouth.

**CASS**, a co. in s.e. N. Dakota, organized in 1873; on the Red river of the north. The northern Pacific and other railroads intersect. The surface is of river valleys and undulating prairie, and the soil is generally fertile; 1764 sq. m. Pop. 1890, 19,618. Co. seat, Fargo.

**CASS**, a co. in n.e. Texas, on the Arkansas and Louisiana border, created in 1846, bounded n. by Sulphur fork, a tributary of Red river; 950 sq. m.; pop. '90, 22,554, incl. colored. It has a heavily wooded and fertile soil, producing cotton, rice, corn, etc. Co. seat, Linden.

**CASS, LEWIS**, an American statesman, b. at Exeter, N. H., in 1782. He was educated for the law, but quitting that profession, he entered the army in 1813, and rose rapidly to the rank of gen., though his merit was not very conspicuous. In 1813, he was elected governor of Michigan, in which state he settled. During his governorship, he kept himself apart from party politics, yet all his measures had a decidedly democratic tendency. In 1831, C. was made minister at war under gen. Jackson, and in 1836 he was sent as plenipotentiary to Paris. In this capacity he made himself popular by his replies, in *Galignani's Messenger*, to the attacks of the English press on the claims of the union with regard to its n.e. boundaries, and by his protest against the measures of Guizot; but the treaty concluded by Daniel Webster with lord Ashburton was so much opposed to the views maintained by C., that he resigned his post, and in 1843 returned to America, where he was received with marks of popular favor. He now aimed at the presidency, and in 1844 was put in nomination, but was defeated, as also in 1848, when he made another effort to obtain the supreme office. In 1857 he was appointed secretary of state, resigning office in 1860. Though active and energetic, he had no claim whatever to anything like comprehensive statesmanship. In regard to slavery, his ideas were ludicrously inconsistent, determined solely, as it would seem, by a view to what would be popular with those whose favor he was seeking to secure at the moment. Latterly, he supported the slave-holding party until the slave states seceded in 1861, from which time he was an ardent supporter of the union. But he was chiefly remarkable on account of his bitter hostility to Britain, against which he was ever ready to inflame the minds of his countrymen on the slightest and silliest pretext. He is author of the *History, Tradition, Languages, etc., of Indians in the United*

*States; of France—its King, Court, and Government; and other works. He died in June, 1866. See McLaughlin, Lewis Cass (Boston, 1891).*

**CASSABA**, or **CASABA**, a t. in Asia Minor, 68 m. e. of Smyrna, with which it is connected by a railroad. C. has a flourishing trade with the surrounding district. Cotton is one of the chief articles of trade, and silk-worms are raised for export. Another valuable industry is the raising of melons for the Constantinople market. In 1865 a large portion of the town was destroyed by fire, and in the same year there were many deaths from cholera. Pop. about 23,000, three-fourths of whom are Mohammedans.

**CASSAGNAC**. See **GRANIER DE CASSAGNAC**.

**CASSANDER**, king of Macedonia, and son of Antipater, was b. about 354 B.C. When young, he is said to have been ill used by Alexander the great, and to have consequently conceived a mortal hatred to that monarch's family. On the death of his father, he expected to succeed to the regency; but Polysperchon received the honor instead, which so dissatisfied him, that he resolved to contest the sovereignty with his opponent. He was completely successful; but while pursuing his career of conquest in the s. of Greece, he learned that Olympias, mother of Alexander, was committing havoc in the north, and consequently hurried back to Macedonia. In less than a year Olympias was taken prisoner, and put to death. Only Roxana, wife of Alexander, and her son *Aegus*, now stood between him and the throne of Macedon; but he did not find it convenient to "make away" with these two until several years had passed. Meanwhile, he married Thessalonica, half-sister to Alexander, in whose honor he founded, about 316 B.C., the town which bears her name. In the following year he caused Thebes, which Alexander had destroyed, to be rebuilt. He next became involved in a war with Antigonus, king of Asia, which, with an intervening peace of one year, lasted from 315 to 301 B.C., in the last of which years Antigonus was defeated and slain at the battle of Ipsus. Along with his auxiliaries, Seleucus, Ptolemy, and Lysimachus, he seized and shared the dominions of the vanquished. The rest of his life was spent in intrigue and military enterprise. He died 297 or 296 B.C.

**CASSANDER**, **GEORGE**, 1515-66; a native of Zeeland; professor of classics at Bruges and Ghent; spent most of his life in trying to effect a union between the Roman Catholic and Protestant churches; to which end he published several works, which had the distinction of being both fiercely attacked by Calvin and pointedly denounced by the council of Trent.

**CASSANDRA**, according to Homeric legend, was the fairest daughter of Priam and Hecuba, and the twin-sister of Helenus. The children playing in the court of the temple of the Thymbræan Apollo, not far from Ilium, till it was too late for them to return home, a bed of laurel twigs was made for them in the temple; and there, in the morning, two snakes were found licking their ears, from which resulted such an acuteness of hearing, that they could hear the voice of the gods. C. afterwards attracted the love of Apollo by her beauty, and he taught her the secrets of prophecy; but displeased by her rejection of his suit, laid upon her the curse that her vaticinations should never be believed. Accordingly, she prophesied in vain of the treachery of the Grecian horse and the destruction of Troy. On the capture of the city, she fled to the temple of Minerva, but was torn from the altar by the Locrian Ajax, and ravished in the temple. She afterwards, in the distribution of the prey, fell to the share of Agamemnon, to whom she bore twin sons, but was murdered by Clytemnestra.

**CASSANDRA**, a peninsula in the province of Roumelia, European Turkey, situated between the gulfs of Salonica and Cassandra, in lat. 40° n., long 28° 30' e. The ancient name of this headland was *Pallene*. Grain of superior quality is raised here; wool, honey, and wax are produced; and silk-worms are extensively reared. The gulf of Cassandra (ancient *Toronaïous Sinus*) has a length of 33 m. from s.e. to n.w., and a breadth of 10 miles.

**CASSANO**, a t. of Italy, in the province of Cosenza, 34 m. n. of the town of that name. It is situated in a valley in the midst of the most beautiful scenery, has a cathedral, an old castle built on an imposing mass of rock in the midst of the city, and manufactures of linen, leather, silk, cotton, and macaroni. Pop. 9,000.

**CASSANO**, a t. of northern Italy, 17 m. e.n.e. of Milan. It is situated on the right bank of the Adda, here crossed by a bridge on the railway to Brescia, and has extensive silk-mills. C. was the scene of two sanguinary battles—one in 1705, between the French under the duke de Vendôme, and the imperialists under prince Eugene, in which the latter were defeated; the other in 1799, when the Russians and Austrians under Suwarow defeated the French under Moreau. Pop. 4,500.

**CASSATION**, **COURT OF**. In the law of France, the act of annulling the decision of a court or judicial tribunal is called *cassation*, from the verb *casser*, to break or annul (Lat. *quætere*; Eng. *quash*); and the function of cassation, as regards the judgments of all the other courts, is assigned to a special tribunal called the court of C., which may thus be regarded, in a certain sense, as the last and highest court of appeal for the whole country. But as everything is excluded beyond the question whether or not the view taken of the law, and of the proper method of administering it by the inferior tribunal, has



been the right one, the idea attached to this institution is less that of a court in the ordinary sense, than of a department of government to which the duty of inspecting the administration of justice is assigned. By the 65th article of the constitution of the year VIII., it was enacted that there shall be "for the whole of France a tribunal of cassation, which shall pronounce on demands for cassation against judgments in the last resort pronounced by the tribunals;" and the following article of the same constitution bears that this supreme tribunal shall pronounce no judgment on the foundation or merits of the cause, but that, in case of its breaking the judgment pronounced, it shall remit to the tribunal appealed from to pronounce another. The title of tribunal was afterwards changed for that of court, by a *senatus consultum* of the year XII.; but substantially the institution has retained its original character, notwithstanding all the changes of government which have occurred in France. The demand for cassation can be made only by the parties to the suit, or by the *procureur-général* of the court of C. for the public interest. Criminal as well as civil judgment may be reviewed by the court of C., the only exceptions being the judgments of justices of the peace and of courts-martial, military and naval. The delay allowed for bringing a civil case before the court of C. is three months for persons domiciled in France, six months for those in Corsica, a year for American colonists, and two for all persons resident beyond the cape of Good Hope. In criminal matters, the procedure is greatly more prompt, three full days only being allowed to the person condemned to bring his action of C., and the same space being given to the *procureur-général*. In all criminal and police cases, the court of C. may pronounce judgment immediately after the expiry of these days, and must do so within a month. The court of C. is divided into three sections, one of which is devoted to criminal matters. Its staff consists of a president, who has the title of *first* president, and three vice-presidents, who are called presidents; 45 counselors or ordinary judges; a *procureur-général*, or public prosecutor; 6 substitutes, who have the title of advocates-general; and several inferior officers. The presidents and counselors are named by the executive for life, the other officers being removable at pleasure. No judgment can be pronounced unless 11 judges are present, the decision being determined by the majority. Where the numbers are equally divided, 5 judges are called in; and cases of peculiar difficulty may be judged of by the three sections united. The whole court, when presided over by the minister of justice, possesses also the right of discipline and censure over all judges for grave offenses, not specially provided for by the law. When thus constituted, the court of C. may suspend the judges of the imperial courts from the exercise of their functions, and call them to its bar. The *procureur-général* of the court of C. likewise possesses a surveillance over the *procureurs-généraux* of the imperial courts.

The members of this august tribunal wear a red gown with a violet *toque*, or cap of velvet; the robes of the presidents and of the *procureur-général* being doubled with white fur.

**CASSAVA**, a West Indian name of the plant also called Manioc (q. v.), and of the starch produced from it, which is otherwise called Brazilian arrow-root, and is popularly known in Britain as Tapioca (q. v.).

**CASSAY**, or **MANIPUR**, a mountainous country in farther India, to the s.e. of Upper Assam, stretching from 23° 49' to 25° 41' n. lat., and from 93° 5' to 94° 33' e. long., and having an area of 8,300 sq. miles. It contains a pop. estimated at 220,000. It is important to England merely from its being on the Burmese frontier. Accordingly, before the war of 1825 began, it was occupied by the British; and, being permanently ceded at the close of the contest, it was handed over, free from tribute, to the native rajah. The inhabitants are more generally Brahmanists than Buddhists. The productions are tea, rice, tobacco, indigo, cotton, sugar, opium, and mustard. Chief town, Manipur.

**CASSEL**, the capital of the former electorate of Hesse-Cassel, now a portion of Prussia, pleasantly situated on both sides of the Fulda, here a navigable river, 120 m. by rail n.n.e. of Frankfort-on-the-Main. It contained (1895) 81,738 inhabitants, including military and servants and laborers connected with them. The oldest part of the town consists of a few very narrow, crooked streets, close on the banks of the Fulda; the more modern parts are on hills, which rise gently from the river. C. is partially walled. In Friedrichs-Platz, the largest square in any German town, stands the elector's palace, a comparatively mean structure: a little below is the first story of a magnificent palace commenced in 1820, and stopped in the following year by the death of the elector who projected it. Amongst the other public buildings and institutions, one of the most important is the *Museum Fridericianum*, which has a large library containing valuable manuscripts. The picture-gallery contains a large number of paintings, including some excellent specimens of the best masters. In the cabinet of curiosities there are examples showing the gradual development and improvement of watch-making from the earliest invention at Nuremberg to the present time. C. contains an observatory, and is the seat of a number of learned and scientific associations. From 1807 to 1813 it was the capital of the kingdom of Westphalia. The gardens of Wilhelmshöhe—which was assigned by the present emperor of Germany to the late emperor Napoleon as a residence after his fall at Sedan, in Sept., 1870—with their splendid fountains and cascades, and the colossal statue of Hercules, within the hollow of whose club eight persons can

stand at one time, are only 3 m. from Cassel. Among its manufactures are textiles, machinery, iron wares and scientific and musical instruments. Under the name of *Chassala*, the town appears to have existed as early as the 10th century.

**CASSEL**, a t. of France, in the department of the Nord, 27 m. n.w. of Lille. It is pleasantly situated on a hill, overlooking a country on all sides so flat, that the view, although the elevation is only 800 ft., is said to be one of the widest in Europe, extending over the broad fertile plains of Flanders, and to the chalk cliffs of England, and taking in 82 towns and 100 villages. During the great trigonometrical survey undertaken in the reign of the first Napoleon, Mont Cassel was one of the chief signal-stations. C. has manufactures of lace, linen, thread, hostery, etc. Pop. '91, 3981. It was known to the Romans, who had a station here, as *Castellum*.

**CASSEL**, PAULINUS STEPHANUS SELIG (1821-92); a German author of Jewish descent; educated both in Roman Catholic and Protestant schools; finished his studies under Ranke in Berlin, and became a journalist. He was in the Prussian chamber of deputies, 1866-67, and declined re-election, preferring to become minister of Christ church, Berlin. He has published articles and books on the Jews, and on religion and politics.

**CASSIA**, a southern co. of Idaho, formed in 1879, and bounded on the n. by Snake river; 4500 sq.m.; pop. '90, 8143. Co. seat, Albion.

**CASSIA**, a name given by the ancients to a kind of medicinal bark, but their descriptions are so imperfect that it is impossible to determine what bark it is. The name is employed in the English translation of the Old Testament in Exodus xxx. 24, and in Psa. xlv. 8, its use in these places being derived from the Septuagint; and it is not improbably supposed that the substance intended is the same now known in our shops as *C. bark*, or *C. lignea*.—2. *C.* is now the botanical name of a genus of plants of the natural order *leguminosæ*, sub-order *casalpinæ*, containing many species—more than 200 having been described—trees, shrubs, and herbaceous plants, natives of Africa and of the warm parts of Asia and America. They have abruptly pinnate leaves, and flowers with deciduous calyx of five somewhat unequal sepals, corolla of five petals, of which the lower ones are the larger, ten free stamens, of which three are long, four short, and three abortive, and anthers opening by two holes at the top. The leaves and pods of many species have a peculiar sweetish but nauseous smell, and a nauseous bitter taste accompanied with a loathsome sliminess. They seem all to contain the purgative principle called cathartine (q.v.), and the leaves of some of the Asiatic and African species are highly valued, and much used as a medicine, under the name of SENNA (q.v.). The leaves of *C. Marylandica* possess similar properties, and are now used to some extent in the United States of America.—*C. fistula* (*cathartocarpus*) yields the *C.* of the pharmacopœias, the *C. pods*, *pipe C.*, or *purging C.* of the shops. It is a large tree, a native of Egypt and other parts of Africa, perhaps also of the East Indies, in which, at all events, it is now widely diffused and cultivated, as well as in the West Indies and warm parts of America. Its leaves have 4 to 6 pair of ovate smooth leaflets, its flowers are yellow and in loose racemes; its pods, which have obtained for it the name of *pudding-pipe tree*, are sometimes 2 ft. in length, cylindrical, black, consisting of thin brittle woody valves, within which is a cavity divided by numerous thin transverse partitions, each cell containing a single seed imbedded in a soft black pulp. It is this pulp that is the part used in medicine; it has a sweetish mucilaginous taste, and in small doses is a mild laxative. It is sometimes removed from the pods when fresh; or an extract is obtained, after they are dried, by boiling and evaporating. It is said to contain 61 to 69 per cent of sugar. The *C. pods* of the West Indies contain much more pulp, and are therefore more valuable than those imported from the East.—3. *C. bark*, or *C. lignea*, sometimes called *China cinnamon*, is a bark very similar to cinnamon both in appearance and properties; but in thicker pieces, and less closely quilled, of a less sweet and delicate flavor, but more pungent. It is the produce of the *cinnamomum C.*, or *aromaticum*, a tree of the same genus with the cinnamon-tree, a native of China, and extensively cultivated there. It is highly esteemed by the Chinese, and is now largely imported into Europe. As it contains a greater proportion of essential oil, and is also much cheaper than true cinnamon, it is much more generally used. The oil which it contains is called *oil of C.*, and is very similar to oil of cinnamon. Coarse cinnamon is sometimes sold as *cassia*. *C. buds* are believed to be the dried flower-buds of the same tree which yields *C. bark*. They are now imported into the U. S. in large quantities, and are much used in confectionery. In flavor and other qualities they resemble *C. bark*; in appearance they are very similar to cloves.

**CASSIANUS**, JOANNES, or JOANNES MASSILIENSIS, or JOANNES EREMITA, a Christian teacher of the ancient church, who flourished in the early part of the 5th c., and distinguished himself as the promoter of monachism in Southern Gaul, and as the opponent of the extreme dogmas of St. Augustine respecting grace and free-will. Shortly before 415 A.D., he went to Massilia (Marseille), where he founded two monasteries according to the rules laid down in his *De Institutis Cœnobiiorum*. One of these monasteries was for nuns. The other was the famous abbey of St. Victor, which under C. is said to have possessed not less than 5,000 inmates, and which served as a model to a multitude of monastic institutions in Gaul and Spain. His *Collationes Patrum Sceti-*

*corum*, is a work in 24 chapters, each of which gives a "spiritual colloquy between monks in the desert of Sketis," regarding the monastic life, and the vexed questions of theology. C.'s Grecian erudition, his dislike of dogmatic subtleties, and his zeal for monastic habits, led him to oppose the doctrine of St. Augustine on works and grace, and to set up a doctrine which was known by the schoolmen as "semi-pelagianism." See PELAGIANISM. As C.'s doctrine gained support from the Massilian monks, St. Augustine, having been informed of it by his friend Prosper of Aquitaine, wrote strongly against it, especially in his treatise *De Gratia et Libero Arbitrio, contra Collatorum*. It is not known when C. died; but it must have been subsequent to 433 A.D. The first collected edition of the various works attributed to him was published at Basel in 1559; the best at Frankfurt, in 1722. The best account of his life and writings is by Wiggers, *De Johanni C.* (Rostock, 1824-25).

**CASSICAN**, *Cassicus*, a genus of birds allied to starlings, having an exactly conical bill, thick at the base, and extremely sharp pointed, the commissure forming an angulated line, the bill ascending on the forehead, and encroaching circularly on the plumage. They are all American birds of gregarious habits, feeding both on fruits and insects, and "exhibiting such surprising skill and ingenuity in the structure of their nests, that an old lady once gravely asked an American ornithologist whether he did not think they might be taught to darn stockings!" The crested C., or crested oriole (*C. cristatus*), is a native of Brazil, Guiana, and Paraguay. It is about 20 in. long, is sometimes seen in flocks of 50 or 100, and constructs its nest by knitting together shreds of a thin bark, *tillandsias*, etc. The nest is about 36 in. long, and resembles a purse or pouch, the lower end hemispherical, and 10 in. wide, and is suspended from the extremity of a branch of a tall smooth-stemmed tree on the outskirts of a forest, apparently to insure safety from monkeys and serpents. Several of these nests are often to be seen hanging from the branches of the same tree.

**CASSIDARIA**, a genus of mollusks—class *gasteropoda* (q.v.), order *pectinibranchiata*—with univalve shells, generally regarded as belonging to the family *buccinidae* or *whelks* (q.v.), but is forming a connecting link with the family *muricidae* (see MUREX). The shell is ventricose, with a moderately elevated spire, the aperture elongated, and the canal recurved, but not very abruptly—much less so than in the nearly allied genus *cassus*—the columellar lip covered with a plate, and the outer lip similarly margined within. The recent species, which are not numerous, belong to tropical and subtropical seas. Fifty fossil species have been described. The genus first appears in the upper cretaceous measures, where a single species occurs. In the eocene 11 have been found, and about 40 in the pliocene.

**CASSIMERE** (Fr. *casimir*, probably derived from *cashmere*), a thin twilled cloth, about thirty inches in width, either plain or figured, of wool, or wool and cotton, and much used in the manufacture of men's garments. Cassimere is manufactured chiefly on the continent of Europe, and to some extent also in England and in the United States. Cassimere was formerly known as *kersey* or *kerseymere* (q.v.), a name which is itself a corruption of *Cassimere*.

**CASSIN**, JOHN, 1813-69; b. Penn.; except a few years in business, he devoted most of his life to ornithology, and published many works thereon, among which are *Birds of California*; *American Ornithology*; *Mammalogy and Ornithology of the U. S. Exploring Expedition*; *Ornithology of the Japan Exploring Expedition*; *Ornithology of Gillies's Astronomical Expedition to Chili*; a portion of the *Ornithology of the Pacific Railroad Explorations and Surveys*; and the ornithology of the *Iconographic Encyclopædia*. He was grand-nephew of Commodore John Cassin, and nephew of Commodore Stephen Cassin, both of the U. S. navy.

**CASSINI**, the name of a family distinguished by their services in astronomy and geography.

**CASSINI**, GIOVANNI DOMENICO, was b. at Perinaldo, near Nice, on the 8th of June, 1625, and studied at the college of Jesuits, Genoa. In 1650 he was appointed to the astronomical chair in the university of Bologna. His first work related to the comet of 1652. He subsequently devoted himself to the determination of astronomical refraction, and of the sun's parallax, etc. In 1664-65 he determined the period of Jupiter's rotation. Subsequently, he determined the periods of the planets Mars and Venus, as also of the apparent rotation of the sun. He it was who discovered the third and fifth satellites of Saturn, and afterwards the first and second, as well as the dual character of that planet's ring. He was also the first who carefully observed the zodiacal light; he demonstrated that the axis of the moon was not (as had been believed) at a right angle to the ecliptic, and explained the cause of the phenomenon known under the name of lunar libration. One of his finest observations was the coincidence of the nodes of the moon's equator and orbit. C. died Sept. 14, 1712, at Paris, whither he had gone in 1669, at the invitation of Colbert, to take charge of the observatory.

**CASSINI**, JACQUES, son of the preceding was b. at Paris, Feb. 18, 1677. In 1694 he was elected a member of the academy of sciences. He traveled in Italy, Holland, and England, where he formed the acquaintance of Newton, Halley, Flamsteed, etc., and was elected a member of the royal society of London. On the death of his father, he succeeded to the charge of the observatory at Paris, and died April 16, 1756. C. wrote several treatises on electricity, the barometer, etc. In his treatise, *De la Grandeur et de la Figure de la Terre* (Par. 1720), he attempted to show that the earth must be a spheroid.

elongated at the poles. The Newtonians denied this, inasmuch as it was opposed to the ascertained facts of gravitation and rotation, which necessitated the earth's being a spheroid flattened at the poles. As an observer, C. was eminently successful. He determined the periods of rotation of all the satellites of Saturn then known, the inclination of the planetary orbits, the obliquity of the ecliptic very nearly, and the length of the year, etc.—His son, CÆSAR CASSINI, was also engaged in scientific pursuits.

CASSINI, JEAN DOMINIQUE, Comte de, the son of Cæsar Cassini, was b. at Paris, June 30, 1748. He succeeded to the charge of the observatory, and completed in 1789 the great topographical map of France, begun by his father. But it having been decreed in 1793 that the observatory should no longer be in the hands of one person, three others were in consequence elected to the superintendence of it along with C., whose conduct on learning this fact showed that he had a greater regard for his own dignity than for the whole stellar universe. He refused to have anything more to do with astronomical science, and obstinately kept his purpose through a life that lasted nearly a century, and which was apparently so prolonged to test the durability of a Frenchman's disdain. In his 95th year he published a small volume of poems! He died Oct. 18, 1845.

CASSINO, a game at cards played by two or more persons. Four cards are dealt, one at a time, to each player, and four are turned face up on the table. After the hands are played the greatest number of cards counts the holder three, the greatest number of spades one, big C. (the ten of diamonds) two, little C. (the deuce of spades) one, and each ace one, so that eleven can be possibly counted by one person; the whole game is 21. The play is to take from the table as many cards as possible, preferring spades, or aces, or big or little Cassino. The cards are taken by the number of their spots; thus a ten will take a ten, or a nine and an ace, or four aces and a six, or any combination of spots that make just ten. Another part of the game is "building;" for example, a player puts a four on a six to make up ten, meaning to take both when it again comes his turn; but any one having a ten may take them before him; or if he builds a six, the next player may make it a nine, and the next still may put on an ace and call it ten; but in building, the one who makes any particular number must hold the card that will take it. Some persons make a progressive build; that is, if one has a nine and cannot at the time make a nine, he puts a four on a two and calls it six, having of course a three to make nine when it is next his turn to play. But this kind of building is generally ruled out as irregular. A modern variation of the game is now common, in which the knave counts eleven, the queen twelve, the king thirteen, the ace one or fourteen as the players may choose, and the "joker" fifteen. This plan greatly enlarges the number of combinations, and makes the game more intricate; as, for instance, an ace may possibly take three other aces, four deuces, and a tray, making fourteen spots; or the ace may take the big and little C. and two aces, which would make six points in the game.

CASSIODORUS, or (according to several MSS.) CASSIODORUS, MAGNUS AURELIUS a Latin writer, who distinguished himself by his erudition in an age of barbarism, was b. at Scyllaceum (now Squillace), in Calabria, about 468 A.D. He was a member of a noble Roman family, and soon attracted the attention of Odoacer by his superior abilities and accomplishments. Under this monarch he held various offices, but after the defeat and murder of Odoacer by Theodoric the Ostrogoth, he passed into the service of the latter. The highest honors now fell upon him; and for years he administered the Ostrogothic power with remarkable prudence and success. In his 70th year, however, he withdrew to Calabria, where he founded the monastery of Viviers, and employed himself and the other monks in the invaluable work of copying classical MSS.; his great desire being to improve the education of the clergy. C. was about 100 years old when he died. Besides his grammatical and rhetorical manuals, which were used as text-books during the middle ages, he wrote a very important work, entitled *Variarum Epistolarum Libri XII*. This is a collection of state-papers, and is, in fact the most extensive as well as the most reliable source of information which we possess in regard to everything connected with the Ostrogothic rule in Italy. The style, however, is very peculiar, and shows the influence which the political career of C. had exercised on his language and modes of thought. The editio princeps of the *Variarum* was printed at Augsburg in 1538. See Hodgkin, *Letters of Cassiodorus* (1886).

CASSIOPEIA, the lady in her chair, a constellation in the northern hemisphere, near Cepheus, and not far from the n. pole. It is marked by five stars of the third magnitude, forming a figure like an M. A line from Capella to the bright star in Cygnus passes nearly through the middle of this M. C., according to Flamsteed, contains 55 stars, all of small magnitude. The figure is that of a woman sitting in a chair with a branch in her hand. In the year 1572, there all at once appeared in C. a new star. It was first noticed by Tycho Brahé on the 11th Nov., when its luster exceeded that of all the fixed stars, and nearly equaled that of Venus. The star gradually diminished in luster, from the time of its being observed until, in Mar., 1574, it disappeared. It is said to have alarmed all the astronomers of the age. Tycho Brahé wrote a treatise on it, and supposed—without good reasons—that it had previously appeared in 945 and

1264. Sir John Herschel suggested the possibility of its reappearance in 1872, but his suggestion was not verified.

**CASSIQUIA'RE**, or **CASSIQUARI**, a river of Venezuela, South America, forming the a bifurcation of the Orinoco, which it leaves in lat.  $8^{\circ} 10' N.$ , long.  $66^{\circ} 20' W.$ , and after a rapid s.w. course of about 180 m., joins the Rio Negro in lat.  $2^{\circ} 5' N.$ , long.  $67^{\circ} 40' W.$  About 100 yards in breadth when it issues from the Orinoco, it gradually increases until at its union with the Rio Negro it attains a width of 600 yards. By means of this singular river, water-communication is established, through the Amazon, Orinoco, and their affluents, between the interior of Brazil and the Caraccas in Venezuela.

**CAS'SIS** (Fr., the black currant-tree), a French liqueur prepared from black currants; the manufacture has recently become of great importance. See **CURRENT**.

**CASSITE'RIDES**. See **SOILLY ISLES**.

**CAS'SITERITE**, the common ore of tin, the only source of the metal; found in Banca (an island in the Malay archipelago), in Cornwall (England), Spain, Sweden, France, California, and Chili. It consists of 78.38 tin, and 21.62 oxygen; it is found in mass, in fibres, in rolled flakes, and in grains.

**CAS'SIUS LONGINUS**, **CAIUS**, one of Cæsar's assassins. At the breaking out of the civil war, though a tribune of the plebs, he sided with Pompey and the aristocratic faction against Cæsar. He was taken prisoner by the latter, who pardoned him, and even made him one of his legates. In 44 B.C., through the influence of Cæsar, he was made *prætor peregrinus*, and was promised the governorship of Syria in the following year. But his mean and jealous spirit could not endure the burden of gratitude imposed upon him by the generosity of the dictator, and he resolved to be released by the murder of his benefactor. Having attached to himself the mutinous spirits among the subjugated aristocracy, and also won over M. Brutus, the pseudo-patriotic conspiracy was soon matured, and on the 15th of Mar., 44 B.C., Cæsar fell by the daggers of assassins. The result of this bloody deed was not what C. had expected. The popular feeling—as witnessed by the riots that broke out at Cæsar's funeral—was strongly against the murderers; and the military power fell into the hands of Mark Antony. C. therefore fled to the east, and made himself master of Syria. Afterwards he united his forces with those of Brutus, and having greedily plundered Asia Minor, they crossed the Hellespont in the beginning of 42 B.C., marched through Thrace, and took up a superior position near Philippi, in Macedonia. Here they were attacked by Antony and Octavian. The division commanded by C. was totally routed, although, on the other hand, Brutus succeeded in repulsing the troops of Octavian. C., supposing that all was lost, compelled his freedman, Pindarus, to put him to death. C.'s wife, a half-sister of Brutus, survived him upwards of 60 years. She died in the reign of Tiberius, 23 A.D.

**CASSIUS**, **PURPLE OF**, is a coloring substance of very ancient use, which is prepared by adding a mixed solution of protochloride and bichloride of tin gradually to a solution of chloride of gold, when a more or less abundant precipitate of the double stannate of gold and tin,  $Au_2O \cdot SnO_2 + S_2O \cdot S_2O_3(?)$ , is thrown down. The purple of C. is soluble in ammonia, yielding a very pretty purple solution, from which it can again be obtained, with solid form unchanged, by evaporating the ammonia. Mixed with borax, or some fusible glass, purple of C. is employed by the potter to communicate a rich purple or rose tint to the better kinds of china, and it also imparts the red color to the kind of glass known as *Bohemian glass*.

**CASSIUS PARMENSIS**, or **CAIUS CASSIUS SEVERUS**, one of the conspirators against the life of Julius Cæsar. He was an adherent of his namesake Cassius, and fought on his side until their defeat at Philippi. Afterwards he adhered to Pompey, and finally supported Antony until the defeat at Actium. He went to Athens, but was arrested and executed about 30 B. C. by order of Augustus. He made some pretensions to poetry, but he was not the Cassius alluded to by Horace as noted for the abundance and the poverty of his compositions.

**CASSIVELAU'NUS**, a British chief, who fought against Cæsar during his second invasion of the island, 54 B.C. He ruled the country n. of the Thames, and had a great reputation as a warrior, but his capital was taken by the Romans, and he himself compelled to flee. He afterwards sued for peace, which he obtained, on condition of paying tribute and giving hostages.

**CASSOCK**, a long loose coat, formerly in common wear, but now usually worn only by the clergy. As worn by the clergy of the church of England it is a long coat with a single upright collar. Black is the common color for all orders of the clergy, but on state occasions bishops frequently wear purple cassocks. In the Roman Catholic church cassocks vary in color according to the dignity of the wearer—priests wearing black, bishops purple, cardinals scarlet, and the pope white.

**CAS'SOWARY**, *Casuarus*, a genus of birds nearly allied to the ostrich (see **BREVI-PENNES** and **OSTRICH**), but distinctively characterized by still greater shortness of wing, by a laterally compressed bill, by a bony crest, by pendent wattles on the naked neck, and by three toes on each foot, all furnished with claws, the inner toe short, and armed

with a very long and sharp claw. There are also very important anatomical differences in its digestive organs, which are not adapted to the same coarse diet, for the C. "has short intestines and small coeca, wants the intermediate stomach between the crop and gizzard, and its cloaca does not proportionally exceed that of other birds." Only one species is known, *casuarinus galeatus*, sometimes called emu by the older naturalists, before that name was appropriated to the Australian bird which now alone receives it. The C. is a native of the Moluccas, New Guinea, and other Asiatic islands, chiefly inhabiting deep forests. In general appearance, it is not unlike the ostrich, but has a much shorter neck. It is the largest known bird except the ostrich, and its height, when erect, is about 5 feet. It feeds on fruit, eggs, and succulent herbage. When attacked, it defends itself by kicking obliquely backwards with its feet, and by striking with its short wings, the rigid barbleless shafts of which, although useless even to aid it in running, are not without value as weapons. There are only about five of them in each wing, somewhat resembling the quills of a porcupine; and at the end of the last joint of the wing there is a spur. The color of the C. is brownish black; the feathers are loosely webbed, and hang down, so that, at a little distance, the bird seems clothed with hair. Those of the rump are 14 in. long, hanging down in place of a tail. The head and upper part of the neck are naked and of a bluish color, and there are two pendent wattles, partly red and partly blue, on the front of the neck. On the breast is a callous bare part, on which the bird rests its body on the ground. The bony crest or helmet reaches from the base of the bill to the middle of the crown, and is about 3 in. high, exhibiting the most intense blue, purple, and scarlet blended together. The C. lays a few eggs, which it leaves to be hatched by the heat of the sun; and which are greenish, and have a much thinner shell than those of the ostrich. Its flesh is black, tough, and juiceless. The C. is not unfrequently to be seen in menageries in Europe, but is becoming more rare in its native regions, in which it is sometimes kept tame. See illus., OSTRICH, ETC., vol. XI.

**CAST**, an impression produced by pouring a ductile substance, such as plaster of Paris, into a mold. This method was employed by the ancients in multiplying not only objects of art, such as the small household statues of the gods, but articles of direct utility. The so-called *Cells*, or chisels of bronze, which, with the molds for casting them, are found in England, Ireland, and France, testify to the fact that the art of casting from a mold is one of the earliest acquired by semi-civilized nations. Casts are of incalculable value in familiarizing the eyes of those who can never look on the originals with the grand and beautiful forms of antique art. Casting, when applied to metals, is called founding (q.v.).

**CASTAGN'O**, ANDREA DEL, 1390-1457; a painter of the Florentine school, who imitated the naturalists of the time in boldness of attitude, but was deficient in grace and coloring. For several centuries, C. rested under the imputation of having murdered his colleague, Domenico Veneziano, in order to monopolize the then recent secret of oil painting as practiced in Flanders by the Van Eycks; but the charge has been proved untrue, as Domenico outlived C. by four years. One of C.'s extant works is an equestrian figure in the Florentine cathedral.

**CASTALIA**, a fountain on the slope of Parnassus, a little above Delphi, in Phocia, sacred to Apollo and the Muses. It was the "holy-water" of the Delphian temple; and all who came to consult the oracle, or visited the place with any religious purpose whatever, were wont to bathe their hair *rore puro Castalia* (in the pure dew of C.), but those who wished to be purified from murder bathed their whole body. The Roman poets feigned that its waters filled the mind of those who drank of it with poetic inspiration. It was imagined to have some connection with the river Cephissus, and to flow from the subterranean Styx. The fountain, whose waters are still pure and delightful as in the days of classical antiquity, now bears the name of St. John, from a small chapel of that name close by.

**CASTANETS**, a musical instrument of percussion in the form of two hollow nut-shells, which are bound together by a band fastened on the thumb, and struck by the fingers to produce a trilling sound in keeping with the rhythm of the music. The *krotalon* of the ancients was somewhat similar. The C. were introduced into Spain by the Moors, where they retain the name of *castanulas*, from their resemblance to the form of the chestnut. The C. are now much used in the ballet and in the opera.

**CASTAN'EA**. See CHESTNUT.

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**CASTAÑOS**, DON FRANCISCO XAVIER DE, Duke of Baylen, a celebrated Spanish general, was b. at Madrid in 1756, and studied in Germany the military tactics of Frederick the great. For some time after his return to Spain, he had no opportunity of acquiring distinction; but when Napoleon I. invaded that country, C. received the command of a division of the Spanish army, and on the 22d of July, 1808, compelled 20,000 French, under gen. Dupont, to surrender at Baylen. It is asserted, however, that the merit of this prodigious success belonged more to Aloys Reding, a Swiss by birth, and the second in command. In Nov. of the same year, C. was in turn defeated by the French at Tudela. The arrival of Wellington necessarily reduced him to a subordinate position, but he took part in the important battles of Albuera, Salamanca, and Vittoria. In 1811,

he was appointed general of the 4th Spanish *corps d'armée*, and commandant of several provinces. In 1815, he was placed at the head of 80,000 troops, destined to invade France, some of which had already crossed the frontier when the news came of the battle of Waterloo. Although no great favorite with the court politicians, his talents could not be overlooked. In 1825, he was called to the state council, where he became a decided opponent of the Carlist party. He died 24th Sept., 1852, at the advanced age of 96.

**CAST—CASTING-LINE.** The casting-line, in angling, is a gut-line on which the artificial flies are fastened. It is made up of several lengths of gut, knotted together, and, usually from 2 to 4 yards long. The flies are attached at intervals of about 2 ft., and the line with its flies is called a *cast*. The term *cast* is also applied to a part of a stream where certain fish may be taken, as a trout-cast, a salmon-cast.

**CASTE**, a term applied chiefly to distinct classes or sections of society in India, and, in a modified sense, to social distinctions of an exclusive nature among the nations of the west. When, at the end of the 15th c., the Portuguese began to penetrate to India by the cape of Good Hope, and to trade with the Deccan or southern portion of the Indian peninsula, they found arbitrary social laws, full of intricate regulations which constantly interfered with their intercourse with the natives, especially in matters involving the *subdivision of labor*. They found certain pursuits invariably followed by a certain class, and any attempt to induce a man to perform offices not appointed for the class of which he was a member, met with violent opposition, though such offices might, according to European notions, be more honorable than many he was content to fulfill. They observed, also, that these different classes often varied in appearance, the result, in some cases, of their addiction for many generations to the same pursuits; in others, of their having actually arisen from a different stock. Hence they applied to these various divisions of society the term *casta*—a Portuguese and Spanish word, meaning a breed. As applied to these classes of Hindu society, the word has passed into most European languages. From its frequent use in India, it has sometimes been erroneously considered of Hindu origin.\* Of late, it has been spelled *caste*, but by old authors *cast*; and it is even a question whether the word may not be as genuine English, as *casta* is Spanish.

In the s. of India, the Portuguese became acquainted with what is considered the most exaggerated evil of caste. There are found there large numbers of a class called *pariahs*, or, in other districts of India, *chandalas*. They are probably the relics of some early conquered race, who have been degraded by uninterrupted ages of oppression, as is represented to have been the case with the Helots of Sparta, and people in a similar condition. These pariahs were always identified with outcasts—i.e., persons who had forfeited the privileges of their original order. No one of any C. would have any communication with them. If one of them even touched a Nair, or warrior of high C., he might with impunity kill him. Some sorts of food were defiled by even their shadow passing over them; and the name of Pariah or Chandala conveyed to the Hindu the idea of the utmost vileness and disgust. All who violated the institutions of their class were held to sink into this class—a condition which involved the loss of all human respectability and comfort. These regulations were, moreover, referred to religion.

As India was at this time the land of the marvelous, and its inhabitants, though as various as the different nations of Europe, viewed as one homogeneous people, what was only true of one portion of the peninsula, was considered as prevailing everywhere, and as identical with the divisions of the Indians into *seven* tribes or *castes*, mentioned in olden times by Strabo, by Diodorus Siculus, and by Arrian. Nor was it forgotten that the Egyptians, whose early civilization was as undoubted as that of India, were also divided, according to Herodotus, into seven classes of priests, warriors, herdsmen, swineherds, tradesmen, interpreters, and pilots, to each of which were assigned particular districts.

About the middle of the 16th c., however, Abraham Roger, chaplain of the Dutch factory at Pulicat, gained the confidence of a Brahman, acquainted with the Sanscrit language, and by this means learned pretty exactly the account of the origin of C. given in the *Laws of Manu*, a work inferred to have been written not later than 900 B.C., which was long known only by name in Europe, until about the end of the last century, when a copy was obtained, and translated by sir William Jones. The whole of the Hindus are represented by Manu as divided into four classes:

1. The *Brahmans*, or *sacerdotal class*, who are said, at the moment of creation, to have issued from the *mouth* of Brahma. Their business is reading and teaching the Vedas, and the performance of sacrifice for themselves and others. They are to be the chief of all created beings; the rest of mortals enjoy life through them. By their imprecations, they can destroy kings, with all their troops, and elephants, and pomps. Indra, when cursed by one of them, was hurled from his own heaven, and compelled to animate a cat. Hence, the Brahman is to be treated with the most profound respect, even by kings. His life and person are protected by the severest laws in this world, and the most tremendous denunciations for the next. His own offenses are treated with singular lenity; all offenses against him, with terrible severity. He is forbidden

\* In Sanscrit, *castes* are called *varnas*, i.e., "colors;" color being, no doubt, the chief distinction at first.

to live by service, but on alms; and it is incumbent upon virtuous men and kings to support him with liberality; and all ceremonies of religion involve feasts and presents to him. The first part of his life is to be devoted to an unremitting study of the Vedas—books, be it observed, older than the code of Menu, and yet, except, perhaps, one of the later hymns, containing no mention of C. as a religious ordinance. He is to perform servile offices for his preceptor, and beg from door to door. In the second quarter, he lives with his wife, reads and teaches the Vedas, assists at sacrifices, and, “clean and decent, his hair and beard clipped, his passions subdued, his mantle white, his body pure, with a staff and a copy of the Vedas in his hand, and bright golden rings in his ears,” he leads a studious and decorous life. The third quarter of his life he must spend in the woods, as an anchorite, clad in bark, without fire, wholly silent, and feeding on roots and fruits. The last period he is released from external forms and mortifications, and is to spend his time meditating on the divinity, until at length he quits the body, “as a bird leaves the branch of a tree, at pleasure.”

2. The *Kshatrya*, or *Chuttree*, or *military class*, sprang from the *arm* of Brahma, and bear something of a sacred character. It is stated that the sacerdotal order cannot prosper without the military, or the military without the sacerdotal; and the prosperity of both, as well in this world as in the next, is made to depend on their cordial union. The *Kshatrya* are to give alms, to sacrifice, to read the Vedas, and defend the people. Though Brahmans are to draw up and interpret laws, they are carefully excluded from administering them. The *executive* government is vested in the *Kshatryas* alone.

3. The *Vaisya*, or *Bais*, or *mercantile class*, sprang from the *thigh* of Brahma. Their grand duties are to keep cattle, carry on trade, lend on interest, cultivate the soil, and turn their attention to every description of practical knowledge. They are to be perfect men of business.

4. The *Sudras*, or *Sooders*, or *servile class*, came from the *foot* of Brahma. They are to serve the three superior classes, more especially the Brahmans. Their condition is never to be improved; they are not to accumulate property, and are unable by any means to approach the dignity of the higher classes. Utter and entire submissiveness to the Brahmans is the spirit of all a Sudra's duties, and this is to be enforced by penalties as severe as they are ridiculous. Yet, withal, the Sudras were not to be slaves, either public or private, and to occupy a position much higher than the Chandalas.

Mixture of castes, though not absolutely forbidden, entails disadvantages on the children, and the offspring of a Brahmanical woman and a Sudra becomes a Chandala, or outcast.

Such—omitting the minute and childish laws and penalties, many hundreds in number, by which it is proposed to carry the principle of C. into the pettiest affairs of life—is a brief outline of it, as gathered from the code of Menu. There is no historical evidence that it ever existed in this form, and, from the nature of the case, we may conclude that it never did. In the *Toy-cart*, the oldest Hindu drama, no extravagant veneration for Brahmans anywhere appears. In fact, one of them is condemned to death; and the arrangements of society appear to have been the same as at present. The laws of C. form, it is true, a part of what is reputed to be Hindu law, but they have remained in all the states of India, Hindu as well as Mohammedan, to a great extent a dead-letter. There is nothing to show that the code of Menu was drawn up for the regulation of any particular state. Some have even conjectured that it may have been the work of some learned man, designed to set forth his idea of a perfect commonwealth under Hindu institutions, just as Plato in *The Republic* gives us his idea of a model government under Greek institutions.

Be this as it may, the C. which at present exists throughout the greater part of India is very different from that described in the code of Menu, though to this it owes, no doubt, much of its stability and its importance in the eyes of Europeans. With the exception of the Brahmans, the pure castes have disappeared, and out of the intermixture of the others have sprung innumerable classes, many of them unauthorized except by the people themselves. So ingrained in the whole community is this tendency to class distinctions, that Mussulmans, Jews, Parsees, and Christians fall, in some degree, into it; and even excommunicated or outcast Pariahs form castes among themselves. Most of the existing castes partake of the nature of associations for mutual support or familiar intercourse, and are dependent upon a man's trade, occupation, or profession. Many of them have been described by Mr. Colebrook in the *Asiatic Transactions*, vol. v. Many have had their origin in guilds, in schism from other castes, in the possession of a particular sort of property (as, for instance, landlords are spoken of as the C. of *zemindars*), and similar accidental circumstances. Their names are often due to the district in which the C. took its rise, to their founder, to their peculiar creed, or any random circumstance. In the Bengal presidency, there are many hundreds of such castes, almost every district containing some unknown in those adjacent. Among the lowest classes, and especially among the servants of the English at Calcutta, it has degenerated into a fastidious tenacity of the rights and privileges of station. For example, the man who sweeps your room will not take an empty cup from your hand; your groom will not mow a little grass; a coolie will carry any load, however offensive, upon his head, but even in a matter of life and death, would refuse to carry a man, for that is the business of another caste. Such and many other regulations are described in



every work on C., but are as unworthy of serious regard as are the assertions of self-importance found among little people all the world over. When an English servant pleads that such a thing "is not his place," his excuse is analogous to that of the Hindu servant when he pleads his caste. When an Englishman of birth or profession, which is held to confer gentility, refuses to associate with a tradesman or mechanic—or when members of a secret order exclude all others from their meetings—or when any other similar social distinction arises, it would present itself to the mind of the Hindu as a regulation of caste.

Nor does C., at the present day, *te a man down to follow his father's business*, except, perhaps, in the case of the more sacred functions of the Brahmins. For the rest, Brahmins serve as soldiers, and even as cooks. Men of all castes have risen to power, just as in England our statesmen have sprung from every class of society. Nor, again, is loss of C. anything so terrible as has been represented; in most cases, it may be recovered by a frugal repast given to the members of the C.; or the outcast joins another C., among whom he will commonly be received with the heartiness due to a new convert. The question of the restoration of a Christian convert wishing to rejoin the Brahmanical C., has been differently decided by his fellow caste-men in different places.

As in the west, so in the east, C. enters into all the most ordinary relations of life, producing laws often most tyrannical and too anomalous to admit of generalization. In the west, however, whilst good sense and Christianity have ever tended to ameliorate social differences, the feeble mind of the Hindu and the records of his religion have had a contrary effect.

These modified views of C., which have begun to prevail in recent years, will be found more fully developed in *Shore On Indian Affairs*, Irving's *Theory and Practice of Caste*. Full accounts of the petty regulations of C., as laid down in the code of Menu, may be seen in sir William Jones's *Translation of the Code of Menu*, Robertson's *Disquisition on India*, Richard's *India*, Elphinstone's *History of India*, Dubois's *India*, Colebrooke's *Asiatic Transactions*, vol. v., and in various articles in the *Calcutta Review*. The most authoritative account of the subject of caste is to be found in the first volume of Dr. John Muir's *Original Sanscrit Texts on the Origin and Progress of the Religion and Institutions on India; collected, translated into English, and illustrated by Notes* (5 vols., Lond. 1867-71; vols. 1 to 4, new ed.), a work of the utmost value.

The question how C. is to be dealt with in converts to Christianity, has now been determined by common consent of missionaries in India; and it receives no recognition within the Christian church. An opposite policy, in former times, founded on the opinion that C. might be regarded as merely a civil or social institution, and not as a part of the religion of the Hindus, is now believed to have been among the principal causes of the comparative decay of the churches or congregations founded during the 18th c. in the s. of India.

**CASTEGGIO**, or **MONTEBELLO**, a t. of Piedmont, northern Italy, 5 m. e.n.e. of Voghera. In the campaign of 1859, C. was occupied by Austrians prior to the battle of Montebello, in which they were defeated by the French and Sardinians. C. was also valorously but unsuccessfully defended by the Austrians in the great battle of Montebello between them and the army of Napoleon I. in 1800. As *Clasidium*, C. was an important military position as early as the times of the Gallic and Punic wars. Some Roman antiquities still remain, and numerous curious inscriptions and coins have been found. Pop. about 4000.

**CASTEL'** (from the Latin *Castellum*) is a name prefixed to various places in Italy, France, Spain, Portugal, etc., of which the most important are:

1. **CASTEL-ARQUATO**, a t. of Parma, n. Italy, 19 m. s.e. of Piacenza, picturesquely situated amid forests and vineyards, with a fine Gothic church and a noble old castle, from which the town derives its name. It has manufactures of silk, and a pop. of 4,400.

2. **CASTEL-BOLOGNESE**, a t. of n. Italy, about 23 m. w.s.w. from Ravenna. It derives its name from a strong fortress built here by the Bolognese in the 14th c.; and is historically famous as the scene of a decisive battle between the Milanese and Florentines in 1434, in which the latter were completely vanquished.

3. **CASTEL-BUONO**, a t. of Sicily, in the province of Palermo, 8 m. s.e. of Cefalu. It is noted for its mineral springs, and has a trade in manna. Pop. 5,388.

4. **CASTEL-FRANCO**, a t. of central Italy, 8 m. e. of Modena, with the old walls and ramparts of a castle built by Urban VIII., and near the site of the battle between the consuls Hirtius and Pansa and Mark Antony.—Also the name of a town of Italy, in the government of Venice, about 25 m. n.w. from the city of that name, with linen and woolen manufactures, and a pop. of 4,220.

5. **CASTEL-GANDOLFO**, a village of the former Papal states, 11 m. s.e. of Rome, near the w. shore of lake Albano. Its situation is extremely picturesque, and it commands extensive views of some of the most beautiful scenery in Italy. The pope has his summer residence here. In early times, the noble family of the Savelli had a stronghold at C., by means of which, for a period of nearly 400 years, they bade defiance to popes, barons, and *bourgeoisie*. Pop. 1,994.

6. **CASTEL-SARDO** (formerly *C. Aragonese*), a fortified t. and seaport, the strongest

on the island of Sardinia, is situated on a steep rock on the n. coast, 16 m. n.e. of Sassari. The environs produce wine. Pop. 2,076.

7. CASTEL-SARRASIN, a t. of France, in the department of Tarn et Garonne, on the Songuine, 12 m. w. from Montauban. It has the remains of an old castle said to be of Saracenic origin, a pop. in 1876 of 8,547, manufactures of serge and worsted stockings, and a trade in the agricultural produce of the district.

8. CASTEL-TERMINI (ancient *Camicianus Aquæ*), a t. of Sicily, in the province of Girgenti, and 16 m. n. from the city of that name. It has extensive mines of rock-salt and sulphur, and a pop. of 9,831.

9. CASTEL-VETRANO, a t. of Sicily, in the province of Trapani, 20 m. s.e. of the town of that name. It is an interesting place, with an old castle, several convents, manufactures of articles of coral and alabaster, and a pop. in 1881 of 20,053. Some of the most esteemed white wine of Sicily is produced in the vicinity.

**CASTELAR', EMILIO**, b. 1832; an author, statesman, and president of the Spanish republic. He was the son of a broker, and at the death of his father was left in poverty, but managed to secure a good education. He came before the public as a writer of novels, more prominently as an advanced liberal in politics. In 1858, he obtained the professorship of history in the university of Madrid, but lost the place in 1864, in consequence of joining Carrasén in the establishment of *La Democracia*, a radical journal. The paper was suppressed in 1866, and C. was sentenced to death for participation in the disturbance of June in that year; but he escaped to Switzerland, and subsequently went to France. At the beginning of the revolution in 1868 he went back to Spain and resumed his professorship, and in 1869 was one of the few republicans returned to the Cortes. In that body he advocated republicanism and vigorously opposed the prospect of a regency. In the government chosen by the Cortes after the abdication of Amadeo C. was made minister of foreign affairs. In Aug., 1873, he was elected president of the Cortes, but vacated the post when, Sept. 6, he was nominated for president of the executive power. His first act was to prorogue the Cortes and assume complete authority. He made energetic but ineffectual efforts to suppress the Carlists, and sent the minister of war to Cuba, in person, to protect Spanish interests in that island. When the Cortes re-assembled, Jan. 2, 1874, a vote of confidence in president C. was defeated, and he at once resigned. Thereupon, Pavia, as capt.gen. of Madrid, forcibly dissolved the Cortes and appointed a provisional government with Marshal Serrano at its head. Soon after the pronunciamiento in favor of Alphonso XII., Dec. 18, 1874, C. went to Switzerland, whence in Mar. 1875, he sent back his resignation of the chair of history in the university of Madrid. Among his writings are novels, poems, works on politics, slavery, the war in Africa, *Old Rome and New Italy* (translated into English), a life of Columbus also translated into English (1892), parliamentary discourses, etc. In 1893 he announced his retirement from public life, and declared the monarchy to be the only stable form of government possible in Spain.

**CASTELL, EDMUND**, 1606-85; an English orientalist who spent 18 years in compiling a lexicon of Hebrew, Chaldean, Syrian, Samaritan, Ethiopic, Arabic, and Persian. He spent from 16 to 18 hours a day on the work, and had 14 assistants. The outlay was \$60,000, which reduced him to poverty, but his losses were in part compensated by a number of preferments, among them that of prebend of Canterbury. C. assisted Dr. Walter in the preparation of the polyglot Bible.

**CASTELLAMARE**, a fortified city and seaport of s. Italy, about 17 m. s.e. of the city of Naples. It is built on the lower slopes of Monte d'Auro, and along a sheltered beach on the s.e. side of the gulf of Naples, over which it commands a magnificent view. It is on or near the site of the ancient *Stabia*, which was desolated by Sylla during the social war, and where the elder Pliny afterwards lost his wife when the city was overwhelmed with lava from Vesuvius. Some ancient remains have been found here. The town was sacked in the 15th c. by pope Pius II., and again in the 17th c. by the duc de Guise. It has a royal palace, a cathedral, several convents, among which that founded by Gonsalvo de Cordova, in the 16th c., is famous for the possession of an image of the Madonna found in a well in the 11th c., which is greatly venerated by the peasantry, who make an annual pilgrimage to the church. The old castle, which gave name to the town, was built in the 12th century. C. has a royal dockyard, affording employment to many of the inhabitants, and manufactures of linen, silk, cotton, leather, and sail-cloth. Pop. 27,000.—**CASTELLAMARE** is also the name of a town in Sicily, situated at the head of a gulf of the same name, and 20 m. e. from Trapani. It has a population of 14,000, and exports of cotton, wine, fruit, and manna.—C., **GULF OF**, is an extensive bay on the n. coast of Sicily. Its width from e. to w., between point Uomo Morto and cape St. Vito, is about 15 m.

**CASTELLAMONTE**, a t. of n. Italy, in the province of Turin, 10 m. s.w. of Ivrea. It has an old castle, manufactures of earthenware, and a trade in the agricultural produce of the district. Pop. 6000.

**CASTELLAN**, or **CHÂTELAN**, the keeper of a castle or *burg* in the middle ages. The office and the rank of the C. were various in various countries. In France and Flanders, the title C. belonged to the holders of certain demesnes, and was next in order of rank to that of a baillif. In Germany, the C. had the jurisdiction of a burg-graf during the

ages of chivalry. In Poland, the title of C., with its appendages, remained in later times, and, after the 16th c., the castellans, with the waiwodes and bishops, formed the senate or superior legislative chamber.

**CASTELLANA**, a t. of s. Italy, in the province of Bari, and 26 m. s.e. of the city of that name. Its trade is confined to the produce of the district. Pop. 10,000.

**CASTELLANETA**, a t. of s. Italy, in the province of Lecce, 20 m. n.w. of Taranto. It has a cathedral and several convents. Cotton is grown in the district. Pop. 9,000.

**CASTELLAZZO**, a t. of n. Italy, about 5 m. s.w. of Alessandria. Pop. 6000.

**CASTELLEONE**, a t. of Lombardy, n. Italy, situated near the Oglio, about 12 m. n.n.w. of Cremona. It is surrounded by old walls, has a fine church, and a population of 6,000.

**CASTELLIO**, or **CASTALIO**, SEBASTIANUS, a theologian, b. in Dauphiné in 1515. His proper name was *Châteillon*, which he Latinized, according to the usage of his time. About 1540, he was invited to Geneva, by Calvin, and appointed humanity professor; but having the misfortune, afterwards, to differ from the reformer in religious opinion, he was banished from the city, and went to Basel, where he spent the rest of his life in great poverty. He died in 1563. See CALVIN.

Among his various writings may be mentioned *De Hæreticis*, etc.—a treatise which argues against the right of the magistrate to punish heretical opinions, and which produced a reply from Beza; a Latin version of the Old and New Testaments, published in 1551, and dedicated to Edward VI. of England; and a posthumous work, in dialogue, on predestination, election, free-will, and faith, first published by Faustus Socinus in 1578.

**CASTELLO**, GIOVANNI BATTISTA, 1500–70; an Italian historical painter of the Genoese school. His best known works are the "Martyrdom of St. Sebastian," and "Our Saviour as Judge of the World." He was also an architect and sculptor.

**CASTELLO**, VALERIO, 1625–59; a son of Giovanni Battista, who excelled his father in painting, especially in cattle scenes. He decorated the cupola of the church of the Annunciation, in Genoa, and painted the "Rape of the Sabines," in the Brignole palace in that city.

**CASTELLON'**, a province in e. Spain, on the Mediterranean, 2447 sq.m.; pop. '87 292,487. It is a rough and mountainous region, containing many mines, and mineral springs. A railroad runs through the province parallel with, and not far from, the sea. The chief town is Castellon de la Plana, near the Mediterranean, 40 m. n.n.e. of Valencia, with which there is railroad connection.

**CASTELLON DE LA PLANA**, a t. of Spain, capital of the province of the same name, is situated in the midst of a fruitful plain, about 4 m. from the Mediterranean, and 40 m. n.n.e. of Valencia. A magnificent aqueduct supplies the means of irrigation. C. is surrounded by walls, and is for the most part well built. It has some handsome old churches, and a singular bell-tower, 260 ft. high. Ribalta, the celebrated Spanish painter, was a native of Castellon de la Plana. It has manufactures of linen, woolen, sail-cloth, paper, earthenware, and fire-arms; also brandy distilleries, and an active trade. Pop. 25,198.

**CASTELNAU'**, FRANCIS, Count, 1812–80; b. London, England; traveled through North America 1837–41; was chief of a French government scientific expedition to South America 1841–7; held several consulships; and published *Expédition dans les parties centrales de l'Amérique du Sud* (1850–1).

**CASTELNAU'**, MICHEL DE, SIEUR DE LA MAUVISSIÈRE, 1520–92; a French soldier, and ambassador to the court of queen Elizabeth. He was thoroughly educated, traveled much, and served in the French army in active service in Italy, where his courage and ability secured for him the friendship of the cardinal of Lorraine, who took him into his service. In 1557 he was given a command in the navy, but soon rejoined the French army in Picardy. He executed several delicate diplomatic commissions so satisfactorily to the constable de Montmorency that he was sent by the king to Henry II. of Scotland with dispatches for Mary Stuart, who was then betrothed to the Dauphin (afterwards Francis II). He went also to England and treated with Elizabeth respecting her claims in Calais, a settlement of which was made at the congress of Cambrai. After the death of Francis II. he accompanied the queen (Mary Stuart) to Scotland, remaining a year, during which time he made several journeys to England and attempted to bring about a reconciliation between Mary and Elizabeth, but his wise and temperate counsels were disregarded. In 1562 he retired to France in consequence of the civil war, and was employed against the Protestants of Brittany. He served at the siege of Rouen and at the battle of Dreux, took possession of Tankerville, and contributed in 1563 to the recapture of Havre from the English. Within the next ten years he was employed in a number of important missions; first to queen Elizabeth to negotiate a peace; next to the duke of Alva, the new governor of the Netherlands, on which occasion he discovered the project formed by Condé and Coligny to seize and carry off the royal family (1567). After the battle of St. Denis he was again sent to Germany to solicit aid against the Protestants, and on his return was made governor of St. Dizier. In 1572, he was sent to England by Charles IX. to allay the excite-

ment caused by the massacre of St. Bartholomew, and in the same year was sent to Germany and Switzerland. Two years later he was sent by Henry III. as ambassador to queen Elizabeth's court, where he remained ten years. While on this duty, with a view of strengthening and maintaining the alliance between the two countries he used his influence to procure the marriage of Elizabeth with the duke of Alençon; but Elizabeth made so many promises, only to break them, that C. at last refused to transmit them to his government. On returning to France he was out of favor with the league, lost his governorship of St. Dizier, and was reduced to extreme destitution; but on the accession of Henry IV. he was, though a Roman Catholic, intrusted with many important missions. The memoirs of C. are valuable for their accuracy and impartiality.

**CASTELNAUDARY**, a t. in the department of Aude, France, situated on a declivity, skirted at the base by the canal du Midi, 22 m. from Carcassonne. Pop. '91, 10,069. It has manufactures of woolen and silk fabrics, and earthenware, and carries on a lively trade in agricultural produce. The canal at this point expands into a large basin, which serves as a haven. It suffered dreadfully in the crusade against the Albigenses, and was, in 1212, the scene of a battle between Simon de Montfort and Raymond, count of Toulouse. In 1355, it was captured by the black prince. In 1682, marshal Schomberg here gained a victory over the party of the duke of Orleans, when the brave duke of Montmorency was taken prisoner, and afterwards executed at Toulouse.

**CASTELNUOVO**, a seaport t. of Dalmatia, Austria, situated near the w. entrance of the gulf of Cattaro. It is surrounded by walls, and defended by two forts and a citadel. It has manufactures of brass, and a trade in the produce of the district, which is fertile. It was captured by the British in 1814. Pop., about 2000.

**CASATI, GIOVANNI BATTISTA**, 1721-1803; an Italian poet of humble origin, who rose to the dignity of a canon in the church, but preferred, to further preferment, a life of travel to the gay cities of Europe. In 1782, on the death of Metastasio, he was appointed poet-laureate of Austria, in which position he devoted himself to comic operas. His best known work is *Gli Animali Parlanti*, freely used in W. S. Rose's *Court and Parliament of Beasts*. On the whole, his poems are harmonious and pure in style, lively and sarcastic, but without originality of plot, and often grossly licentious.

**CASTIGLIONE**, a t. of Sicily, province of Catania, on the n. slope of Mt. Etna, on the right bank of the Cantara, 85 m. s.w. of Messina. The town stands on a square rock rising abruptly from the valley, and having a double crest, on which stand a domed church and the ruins of a feudal castle. Here, in 1297, in the war of the Vespers, admiral Roger Toria raised the standard of rebellion against his sovereign, Frederick of Aragon. In the district are several large nut-plantations, which produce the best Sicilian hazel-nuts. Pop. 8,000.

**CASTIGLIONE**, a village on the site of the old city of Gabii, in Italy, 10 m. e. of Rome. The place is noted for ruins of a temple to Juno, a theater, the ancient walls, and other relics of the past.

**CASTIGLIONE**, LAKE OF, a lagoon of central Italy, in the province of Siena. It lies n. of Grosseto, and has a length of about 10 m., with a breadth of from 1 to 3 miles. Receiving the waters of the Bruna and other rivers, it discharges its waters, by a short canal, into the Mediterranean.

**CASTIGLIONE, BALDASAR' RE**, Count, one of the most elegant of the old Italian writers, was b., 1478, at Casatico, in the duchy of Mantua, and studied at Milan. His shining talents, knowledge, and pleasing manners made him a favorite of Guidobaldo di Montefeltro, duke of Urbino, a great patron of literature, at whose court he was honorably entertained, along with other men of eminence in letters. He was employed by the duke as envoy to Henry VIII. of England, who made him a knight; and was afterwards sent in the same capacity to Louis XII. of France, under Guidobaldo's successor, in several important ambassadorial missions. He died at Toledo in 1529. His chief work is the book *Del Cortegiano*, a manual for courtiers, remarkable for its elegant style. His Italian and Latin poems are also models of elegance, and his *Letters* (2 vols., Padua, 1769-71) contain interesting contributions to the political and literary history of his time. Tasso devoted a sonnet to the death of C., and Giulio Romano raised to his memory a monument in Padua.

**CASTIGLIONE, CARLO OTTAVIO**, Count, an eminent Italian philologist, was b. at Milan in 1784. At an early period, he displayed a predilection for antiquarian studies, more particularly numismatics. When only 24 years of age, he published a description of the Kufic coins in the cabinet of Brera, at Milan, under the title, *Monete Oufiche del Museo di Milano* (Milan, 1819), which showed a great knowledge of oriental languages and history. C.'s principal work in the sphere of oriental literature is his *Mémoire géographique et numismatique sur la Partie orientale de la Barbarie appelée Afrিকা par les Arabes, suivi de Recherches sur les Berbères Atlantiques* (Milan, 1826), in which he seeks to ascertain the origin and the history of the towns in Barbary whose names are found on Arabic coins. Out of Italy, C. is perhaps best known by his edition of some fragments of the Mæso-Gothic translation of the Bible by Ulfilas (q.v.), which had been discovered, in 1817, by cardinal Mai among the palimpsests of the Ambrosian library. At

first, he published some specimens in conjunction with Mai, but in 1829, 1834, 1835, and 1839, appeared a variety of fragments of the Pauline epistles, edited by himself, and enriched with valuable disquisitions, commentaries, and glossaries. He died at Genoa, April 10, 1849.

**CASTIGLIONE**, GIOVANNI BENEDETTO, 1616-70; a Genoese painter who studied for some time under Vandyke. He excelled in depicting fairs, markets, and rural scenes, and painted portraits and historical pieces. He also made many etchings which were remarkable for light and shade. Among the most famous of his paintings was "The Nativity of Jesus," in the church of San Luca at Genoa. His brother Salvatore, and his son Francesco, excelled in similar subjects.

**CASTIGLIONE**, GIUSEPPE, 1698-1768; an Italian Jesuit missionary who labored many years in Pekin and other parts of China. He was also an artist of ability, and it is said that the emperor Kien-Long erected several palaces from his designs.

**CASTIGLIONE DEL LÉ STIVIERÉ**, a t. of n. Italy, 22 m. n.w. of Mantua. It is walled and defended by an ancient castle; but is chiefly celebrated on account of the victory obtained here by the French over the Austrians in 1796, and which gave the title of duc de Castiglione to marshal Augereau. Pop. 5,000.

**CASTILE** (Spanish, **CASTIL'LA**) forms, in a geographical and political point of view, the central district of the Spanish peninsula, being the middle and most strongly marked plateau of Spain, as well as the central seat of the monarchy. Both geographically and politically it is divided into Old and New Castile—*Castilla la Vieja* and *Castilla la Nueva*. The former district, situated in 40° 5' to 48° 32' n. lat., and 1° 40' to 5° 35' w. long., rises, in the form of an elevated plateau, to the height of 2,500 to 3,000 feet. It is walled in on all sides: on the n., by the highest masses of the Cantabrian mountains, which separate it from the Basque provinces and Asturias; on the s., by the high ridge forming the watershed between the Douro and the Tagus; while the Sierras de Oca, de Urbion, and Moncayo, and the heights of Leon and Tras-os-Montes bound it on the e. and west. The high plateau of Old C. is but scantily watered, and its natural characteristics far from inviting. In many parts, nothing is presented to the eye but a wide, unwooded, almost treeless waste of land, unrefreshed by streams, in some parts monotonously covered with stunted grasses, and in others almost destitute of vegetation. The traveler may walk many miles without finding a village, or even a solitary farm-house. All Old C., however, is not a dusty desert. There are rich tracts in it producing some of the finest wheat in the world. Madder and grasses are also produced abundantly in some parts; and even the olive flourishes where it is protected from the frost and snow of winter, and from the cold winds prevailing in Oct. and the following months. Iron and other minerals exist in plenty, but are not worked to any great extent. Sheep, cattle, pigs, and mules form the chief wealth of the inhabitants. Manufactures consist of coarse woollens, cotton, linen, leather, and glass.

The plateau of **NEW CASTILE**—which is situated between lat. 38° 23' and 41° 15' n., and long. 1° and 5° 25' w.—like Old C., is also inclosed by mountains. Though lying 1800 ft. lower than Old C., New C. presents many similar characteristics of soil and scenery. It is mostly sterile, and scantily irrigated; little rain falls, and the nightly dews are insufficient to refresh the plains, which are entirely destitute of trees, and, in summer, appear quite burned up. Olives, corn, pulse, and saffron are cultivated in some neighborhoods; but flocks of sheep constitute the chief wealth of extensive tracts of land. The commerce, carried on by means of long trains of mules, reminds the tourist of the caravan traffic over eastern deserts. Industry is almost entirely restricted to manufactures of coarse woollen goods. The yield of the salt-mines in the s. is considerable; and quicksilver, especially at Almaden (q.v.), and iron (manufactured at Toledo) are plentiful. The Castilians have even more than the general haughtiness of the Spanish character. Their language prevails throughout the educated classes, as in the literature of Spain, and their rulers have extended their sway over the whole nation.

In the present administrative division of Spain into forty-nine provinces, the division of Old and New C., though it will long be remembered by the people, is one belonging to past history. Old C. is now divided into the eight provinces of Burgos, Logroño, Santander, Soria, Segovia, Avila, Palencia, and Valladolid. The population, distributed over an area of 25,400 sq.m., amounted, in 1887, to 1,717,402. New C. includes the five provinces—Madrid, Guadalajara, Cuenca, Toledo, and Ciudad Real, and on an area of 20,200 sq.m. had 1,487,712 inhabitants. Besides these provinces, the kingdom of Leon, Galicia, the principality of Asturias, and the districts of Estremadura, Andalusia, Granada, and Murcia, belonged to the crown of Castile.

C. first became an independent country in 762, and remained so until 1028, when it passed to Sancho III., king of Navarre. His son, Ferdinand I. (great), founded the kingdom of C., and among other acquisitions annexed to it the kingdom of Leon. This union, however, was not permanent, Leon being made a separate kingdom for Ferdinand II. The two kingdoms, however, were afterwards reunited in the 13th c. in the person of Ferdinand III., and remained ever after under one scepter. Among the successors of Ferdinand III., the most distinguished was Alfonso X., by whose direction the Alfonsine (astronomical) tables were drawn up. By the marriage of Isabella, sister and successor of Henry IV., with Ferdinand, king of Aragon (1469), the two crowns of C.

and Aragon became united (1479), and from these sprang the kingdom of Spain, which, however, was not fully established before the death of Ferdinand, in 1516, when Charles I. of Spain (Charles V. of Germany) inherited both crowns.

**CASTIL/LA. DON RAMON**, 1796-1867; a Peruvian who entered the Spanish army in 1816, but soon after 1820 joined the revolt against Spanish rule. In 1830, Gamarra made him chief of staff of the whole army, and the provisional president appointed him brig.gen. After the treaty with the president of Bolivia, Castilla went to Chili, and in 1837 joined the Peruvians who marched against Santa Cruz, the president of Bolivia. When the revolutionists proclaimed Gamarra president, Castilla was made minister of war. In 1841, he was one of the leaders of the Peruvian force that invaded Bolivia, and in 1845 he was elected president of Peru. His successor, Echenique, became unpopular, and Castilla started a revolution, overcame Echenique, and became sole ruler of the country. One of his important reforms was the abolition of slavery. In 1858, he was re-elected president, and in 1860, he proclaimed a new constitution which granted universal suffrage and prohibited the exercise of any religion except the Roman Catholic. His last political movement was in 1867, when he led an insurrection against Prado, then president; and he was on his way to Arica when he died.

**CASTILLEJO, CHRISTOVAL DE**, 1494-1556; a Spanish verse-writer of great fertility, whose poems were about the last of the old Spanish school before the changes led by Garcilaso de la Vega. Being strongly anti-clerical, Castillejo's writings were usually noted on the Index Expurgatorius, and were smuggled into Spain from foreign printing-houses, while in a later period the agents of the church altered the verses to suit themselves. The works of Castillejo are in three books, one entitled *Love*, one *Conversation and Pastime*, and the third comprising moral and religious verses. He died in a monastery.

**CASTILLON**, a t. of France, in the department of Gironde, situated on the right bank of the Dordogne, 26 m. e. of Bordeaux. It has manufactures of cotton and woolen yarns, nails, and cordage. It is celebrated as the scene of the battle between the forces of Henry VI. of England and Charles VII. of France, July, 1453, in which the English met with a signal defeat, their leader, the earl of Shrewsbury, and his son, being slain. Of all their possessions in France, Calais alone remained to the English after this battle, the incidents of which were seized on by Shakespeare for the sixth scene in his play of *King Henry VI.*, part I. Pop. about 3000.

**CASTINE**, a town and port of entry in Hancock co., Me., on the Penobscot, 34 m. below Bangor. It was here that the baron de Castine settled in 1667 a French colony, which was soon abandoned in consequence of Indian and English wars. In 1760 it was reoccupied by the English, who made a harbor that was always accessible for the largest ships. Shipbuilding and fishing are the employments of the greater portion of the people, and it is the seat of the Eastern state normal school. Pop. '90, 987.

**CASTING**, in angling, is the term applied to the act of throwing a fly or a fish-bait. In casting a fly with a single-handed rod, the beginner should let out about as much line as the length of the rod; grasp the rod just above the reel; then wave it back over the right or left shoulder, with a slightly circular sweep, so as to extend the line behind; and then bring it forward with a steady cutting kind of action, urging the point of the rod towards the spot where the fly is to fall, taking care not to carry the point of the rod too far forward, or too low, or the line will not fall straight and evenly on the water. The object of the circular sweep behind is to prevent the fly from cracking off. By slightly raising the point of the rod just as the fly is delivered, the line is straightened; and the fly, checked in mid career, falls like thistle-down upon the water. Always allow time for the line to go straight out behind, for if returned too quickly, the fly cracks off. In casting with the double-handed rod, the one hand grasps the rod above the reel, and the other below it, the lower hand acting as a pivot upon which the rod turns.

In casting a bait, either for spinning, trolling, or live-baiting, the bait is suffered to hang from the point of the rod about a yard. Taking the rod in both hands, the line clasped to the rod in his right, the angler waves the bait gently back; and having first drawn as much line as he requires off the reel, and laid it loosely at his feet, he sends the bait forward with a swing towards the point he desires to reach.

**CASTING.** See **FOUNDING**.

**CASTING-NET**, a species of net very widely distributed, having been found in use amongst various savage tribes in different parts of the world, some of whom, from long and constant practice, use it with a dexterity and address unknown in America. The nets used in America are usually from 18 to 20 ft. in circumference when spread out. They are netted in the shape of a kind of long loose bag or cone; and so much is the number of meshes increased as the net progresses, that it is capable of being spread out in a perfectly flat and circular form, the apex of the cone forming the center of the circle. To this apex is attached a rope of some yards in length; when casting, this rope is fastened round the left wrist of the caster. The bottom of the net, which forms, when it is held up by the apex, the base of the cone, or, when spread, the circumference of the circle, is hung around with perforated leads or bullets. These have not only the effect of carrying the net to the bottom of the water, but also, when it is cast, of causing

the net to spread open. The bottom of the net is turned up some 6 in. or more in depth, and hung up on the inside about every 10 in. or so, to an upper portion of the net, by stout strings, so as to form a kind of purse; this is called the "tuck." When the net is required to be cast, the caster, having fastened the rope to his wrist, and coiled it loosely in his left hand, hangs a portion of the net over his left shoulder; and then gathering as much of the outer edge of the net as he can collect in his right hand, and holding it up so as to open the net as much as possible, makes a semicircular sweep of the body and the right hand—rather difficult to accomplish without practice—and whirls the net away off the shoulder. The centrifugal motion thus communicated to the leads, etc., on the bottom of the net, causes it to open like a circle on the surface of the water, the leads carry it to the bottom, and the net thus covers all that comes within its circle. The rope is then pulled gradually, and worked from side to side, in order to narrow the circle, to bring it once more into a cone; and, in their efforts to escape, the fish that may have been covered are gradually driven into the tuck or purse of the net. When the leads are all close together, the net is lifted from the water, and the fish in the tuck are taken out. The cost of a cast-net is regulated by the circumference and the size of the mesh.

**CASTING-VOTE**, the vote by which the chairman or president of a meeting is generally empowered to *cast* the balance on the one side or the other, where the other votes are equally divided. In the House of Commons, the Speaker does not vote at all unless this occurrence takes place. As his position in this respect is felt to be a delicate one for a person whose duty it is to withdraw himself from the contentions of party, it is usual for the speaker to vote in such a way as to give the house an opportunity of reconsidering its decision. The same rule prevails in our Congress. Following a similar rule, the chairman at corporation and general meetings usually gives his casting-vote either in a way that will lead to a reconsideration of the subject, or for what seems the popular view of the case, although that may be at variance with his convictions.

**CAST-IRON**, or **PIG-IRON**. This is the crudest form of iron, and the method of its production is described under the head **IRON**. There are two leading kinds of it, namely, white pig-iron and gray pig-iron; the former is also called *forge-iron*, from the fact of its being chiefly used for conversion into malleable iron and steel; and the latter is often called *foundry-iron*, on account of its suitability for castings. Of each of these, again, there are many varieties; and much light has of late years been thrown on what constitutes their different qualities, by experiments in the manufacture of steel. White cast-iron, when smelted from the argillaceous ores of the coal-measures, is of inferior value to the gray; much of it, indeed, being produced against the will of the iron-master, when the blast-furnace is working badly. But when obtained from pure ores and fuel it is the most valuable kind, because it contains fewer impurities, and has its carbon nearly all in the combined state, in which case it is best suited for the manufacture of wrought-iron and steel. Gray pig-iron contains carbon both in the combined and the uncombined (graphitic) state. In the grayest kind, uncombined carbon greatly prevails, and the fracture of the iron is more distinctly granular or scaly-crystalline than is the case with other varieties. Such cast-iron is usually called No. 1. It is much softer, but fuses at a higher temperature than white pig-iron. It also becomes thinly liquid when melted, and expands slightly just before cooling—properties which render it extremely valuable for castings. As the grayness and graphite-like brightness diminish, the iron is known as No. 2, No. 3, and so on for several numbers, till we come to the close texture and light color of white pig-iron; No. 2 being but slightly different from No. 1, and No. 5 from white-iron, in quality. No. 3 is intermediate between the extremes. When cast-iron is partly gray and partly white, it is called mottled iron. Cast-iron contains from 2 to 5 per cent of carbon, the maximum amount in steel being 2; but steel is practically free from silicon, sulphur, and phosphorus, while cast-iron is not.

**CASTLE** (Sax. *castel*; Lat. *castellum*, dimin. from *castrum*), a building constructed for the purpose of repelling attack. The root of the word is the same as that of *casa*, a little house or hut, and probably means a driving off or repelling; and it is worthy of notice, in confirmation of this view, that in Welsh the radical syllable *cas* signifies a C., separated, and also hatred, malice, etc. The *castella*, left by the Romans in Britain and elsewhere, were constructed on the general model of their stationary encampments (*castra stativa*), (see **CAMP**); and though they may have suggested the castles of the Middle Ages, they differed from them in being designed for military purposes only, and not also as places of permanent residence. Even Burgh castle, in Suffolk, the ancient Garamonium, and Richborough castle, in Kent, the ancient Rutupiae, were encampments or fortresses, rather than castles.

Besides these monuments of the military occupation of the island by the Romans, traces are found in various parts of the country of encampments or castles, which are ascribed to its aboriginal or early inhabitants. These are generally situated on the tops of hills; as, for example, the Herefordshire beacon, on the Malvern hills; Moel Arthur, in Flintshire; Chem castle, in Cornwall; the Maiden castle, in Dorsetshire; the Caterthuns, near Brechin, in Forfarshire; the Barmkin of Echt, in Aberdeenshire. It is probable that the Saxons adapted the Roman castles to a certain extent to their modes of defense, and traces of Saxon and even Norman workmanship are found in struc

tures which are believed to have been originally Roman. One very frequent change consisted in raising a mound of earth on one side of the walls on which the keep or citadel was erected. The Decuman and Prætorian gates were also, as at Portchester, converted into the fortified entrances peculiar to the castellated structures of the middle ages. But of castles designed for residence as well as defense, there are few or none which are of higher antiquity than the conquest. They were part of the organization of the feudal system—castle-guard being one of the duties which the tenants were taken bound to pay in return for their lands; and till that system was developed by the Normans, the residences of persons of importance were probably guarded only by their domestic retainers, or, in extraordinary circumstances, perhaps by the national militia. The absence of strongholds is said to have been a reason why William the Conqueror so easily became master of the kingdom; and it was as a protection against the resentment which the conquest occasioned, that most of the great Norman castles of England were built. As these castles grew in strength by the additions and improvements of each generation, they afforded their possessors the means not only of security from their fellow-subjects, but of independence as regarded the central government. The lord of every C. became a petty tyrant; and no small portion of the history of England, and, indeed, of Europe altogether, during the feudal period, consists of an account of the attempts which were made by the monarch to extirpate what Matthew Paris has emphatically designated as "these nests of devils and dens of thieves." Of castles of this description, it is said that in England, in the reign of Stephen (1135-54), no fewer than 1115 were built.

The Norman C., which was the most complete structure of the kind, was generally surrounded by a moat or ditch; and in order that the ditch might be readily filled with water, the site chosen was usually either on the banks of a river, or on a peninsula running into a lake. In the latter case, the ditch was of course merely a deep cut made through the neck of land, by means of which the C. and its surroundings were converted into an island. On the inner side of the ditch, mounds were constructed, which were surmounted with walls and towers, both of which, but particularly the latter, were supplied with battlements and bastions. The entrance-gates were also protected by towers, which were usually of great strength. The communication was by a bridge, sometimes of stone, but usually of wood, which was made to draw up and down; and the entrance, in addition to thick folding-doors, was protected by a portcullis (q.v.), which was dropped down through grooves in the masonry at the sides. The gateway, in castles of the larger sort, was further defended by a barbican (q.v.). On passing the external wall, you entered the bailey (q.v.), which sometimes consisted of several courts, and contained the barracks, magazines, well, a chapel, and sometimes even a monastery. The only portion of the C. which was always spoken of as distinguished from the bailey, was the keep (q.v.) or citadel, which corresponded to the prætorium of the Roman fortification. The keep was a species of internal C., more strongly defended than any other portion of the fortress, and placed in the most advantageous position, so as to afford a last chance to the garrison when driven from the external works. As the keep had the same design as the C. itself, it contained most of its appliances, even to a chapel, when large and complete. The keep was also called the dungeon or donjon (q.v.). An excellent example of a keep is seen at Rochester Castle. The best known is probably that at Windsor, which forms so prominent an object in the surrounding landscape. The protection which the walls of his C. afforded to the retainers of a baron in a state of society in which life and property were extremely insecure, naturally led to the construction of houses around the moat, and to this custom a very large number of the towns, both in England and on the continent of Europe, owe their origin. Along the banks of the Rhine, this process of town-formation may be seen in all its earlier stages; from the few peasants' houses and the village church nestling under the ivy-covered ruin on the cliff, to the large and prosperous city of Coblenz. Strange as it may seem, the existence of these castles may be regarded not only as a cause, but as an effect of a certain feeling of security on the part of the surrounding population; for where a country was thoroughly insecure, the risk of the castles falling into the hands of the enemy, and thus proving a source not of protection but of oppression, was so great as to prevent their erection. It is on this ground that sir Walter Scott explains the slight character of the fortresses on the Scottish border, notwithstanding centuries of warfare. "It was early discovered that the English surpassed their neighbors in the arts of assaulting and defending fortified places. The policy of the Scotch, therefore, deterred them from erecting upon the borders buildings of such extent and strength, as being once taken by the foe, would have been capable of receiving a permanent garrison. To themselves, the woods and hills of their country were pointed out by the great Bruce as their safest bulwarks; and the maxim of the Douglasses, that 'it was better to hear the lark sing than the mouse cheep,' was adopted by every border chief." For these reasons, "we do not find, on the Scottish borders, the splendid and extensive castles which graced and defended the opposite frontier. The Gothic grandeur of Alnwick, of Raby, and of Naworth, marks the wealthier and more secure state of the English nobles." The residence of the Scottish chieftain, "was commonly a large square battlemented tower, called a *keep* or *peel*, placed on a precipice, or on the banks of a torrent, and, if the ground would permit, surrounded by a moat. In short, the sit-



uation of a border-house, encompassed by woods, and rendered almost inaccessible by torrents, by rocks and morasses, sufficiently indicated the pursuits and apprehensions of its inhabitants."—*Miscellany of the Scottish Border*, Introduction.

**CASTLEBAR**, the capital of the co. of Mayo, Ireland, 159 m. w.n.w. of Dublin. It is situated on the Castlebar river, near the head of a valley at the n.w. end of the great limestone plain which includes the greater part of the counties of Roscommon, Sligo, Galway, and Mayo. The two main streets cross each other, and the chief buildings are in a square near the w. end. The suburbs, as in most of the w. Irish towns, consist of the wretched hovels of agricultural laborers. Pop. about 3500. C. has some coarse linen manufactures. Here the Irish, in the rebellion of 1641, massacred the English parliamentary army, and in 1796 was executed the famous "fighting Fitzgerald." In 1798, the French gen. Humbert, held the town for a fortnight. In 1846 and 1847, C. suffered extremely from the famine.

**CASTLEMAINE**, a t. in the province of Victoria, Australia, 65 m. n.w. of Melbourne; pop. '91, 6082. It was a place of much importance when gold mining began, the diggings near by being among the earliest opened. The Victoria railroad passes through the town.

**CASTLE PEAK**, a peak of the Sierra Nevada in California, about 38° 10' n.; height, according to Whitney, 12,500 feet.

**CASTLEREAGH**, LORD. See LONDONDERRY, MARQUIS OF.

**CASTLES**, in heraldry, are often given as charges in the shields of persons who have reduced them, or been the first to mount their walls in an assault. The practice of heralds, in this as in other respects, has not been very consistent, as we learn that in 1602, a castle was granted by William Cambden, Clarendieux king of arms, to William Frear, doctor of physic.

**CASTLETON**, a town in Richmond co., N. Y., forming the n. portion of Staten island, and occupied in part by the summer residences of business men of the city, pop. '90, 16,423; in '80, 12,679. New Brighton is the only considerable village. The town is on the line of the Staten Island Rapid Transit railroad, which has ferry connections with New York at St. George, and with Perth Amboy, N. J., at Tottenville. Among the institutions is "Sailor's Snug Harbor," a home for old and indigent seamen, established about the beginning of the century by Capt. Randall. The surface of the township is hilly, and there are many charming sites occupied by handsome modern villas, from some of which wide views may be had over the city of New York, and large portions of New Jersey, Long Island, and the ocean.

**CASTLETON**, a town in Rutland co., Vt., 11 m. west of Rutland, on Castleton river and the Central, Vermont and other railroads; pop. '90, 2306. The slate quarries in the neighborhood are valuable. In the town is a state normal school. There are also manufactures of cheese, plows, carriages, etc.

**CASTLETOWN**, the capital town and seat of government of the Isle of Man, called in Manx *Ballei Cashtal*, or the town of the castle. C. is situated on the margin of Castletown bay, near the southern extremity of the island, and surrounds Castle Rushen, a Danish fortress of prodigious strength, having walls from 12 to 18 ft. in thickness, built of the limestone found on the spot, which is of so imperishable a nature that the sharp angles of the keep retain the marks of the builder's chisel, though completed in the 10th century. The castle was founded by Guthred II. of the Orrys kings of Man, and, having been added to from time to time, it now consists of a pile of building of a most imposing appearance. It underwent a six months' siege by Robert Bruce in 1313. The keep is used as the public jail of the island, and the other portion of the castle consists of public offices, officers' apartments, and accommodation for the chancery and other superior courts.

Being in the neighborhood of the bold coast-scenery of the Calf of Man, Spanish head, etc., C. is a desirable resort for the numerous tourists who frequent the Isle of Man. Pop. about 2500.

**CASTOR**, ANTONIUS, an eminent botanist of Rome in the first century after Christ; several times quoted and mentioned by Pliny. He had a botanical garden, probably the earliest on record. He lived more than 100 years in perfect health, it is reported, both of body and mind.

**CASTOREUM**, a substance secreted in two glandular sacs, closely connected with, but quite distinct from, the organs of reproduction in the beaver (q.v.), and at one time held in the highest repute in medicine, although now regarded as almost inert, and chiefly used by perfumers. The C. sacs are pear-shaped, and it appears in commerce in these sacs themselves, connected in pairs as they are taken from the animal. C. is produced both by the male and by the female beaver. In Hudson's bay commerce, ten pair of them are equal in value to one beaver skin. Russian C. is of much higher value than American. C. was well known to the ancients. From the time of Hippocrates, it was regarded as having a specific influence over the uterus, and is still in use in the

n. of Europe. It was at one time also esteemed a most valuable medicine in hysteria, catalepsy, and other spasmodic diseases.

**CASTORIDÆ**, a family of *mammalia*, of the order *rodentia*, of which the beaver (*castor*) is the type, and in which, besides the beaver, the coypu (*myopotamus*), and the *musquash*, some naturalists include other genera more commonly regarded as belonging to the mouse and rat family (*murida*), as the lemmings and voles.

**CASTOR OIL**, a fixed oil obtained from the seeds of the C. O. plant. In extracting the oil, the seeds are first bruised between heavy rollers, and then pressed in hempen bags under a hydraulic or screw press. The best variety of oil is thus obtained by pressure in the cold, and is known as *cold-drawn* C. O.; but if the bruised and pressed seeds be afterwards steamed or heated, and again pressed, a second quality of oil is obtained, which is apt to become partially solid or frozen in cold weather. In either case the crude oil is heated with water to 212° F. (100° C.), which coagulates, and separates the albumen and other impurities. Exposure to the sun's light bleaches the oil, and this process is resorted to on the large scale. When pure and cold-drawn, C. O. is of a light yellow color; but when of an inferior quality, it has a greenish, and occasionally a brownish tinge. It is somewhat thick and viscid. Its specific gravity is high for an oil, being about 960 (water being taken as 1000). It is miscible with alcohol or spirits of wine and ether. Reduced to a temperature of 0° F. (-18° C.), it becomes solid; exposed to the air, it very slowly becomes rancid, then dry and hard, and serves as a connecting link between the drying and non-drying oils. It has a nauseous smell, and an acrid, disagreeable, and sickening taste, which may be overcome by the addition of a little magnesia. The principal acid present in it is *ricinoleic acid*,  $C_{18}H_{34}O_6$ , which is allied to oleic acid.

C. O. is one of the most convenient and mildest of purgative medicines. Given in doses of one or two tea-spoonfuls, with a little peppermint-water, it forms a gentle laxative for habits easily acted on by medicine; while a dose of a table-spoonful, or a little more, will almost always succeed if it remains on the stomach. The only serious objections to the use of C. O., are its disagreeable flavor, and the sickness often produced by it; some persons get over this difficulty by floating the oil in hot coffee, which is said to remove its nauseous quality. It is, however, best given in gelatino capsules.

The adulterations of C. O. may be various. Several of the fixed oils, including lard, may be employed. The best test of its purity is its complete solubility in its own volume of absolute alcohol, which other fixed oils are not. Croton oil is occasionally added to increase the purgative powers of the oil.

The **CASTOR OIL PLANT** (*ricinus communis*) is a native of the s. of Asia, but now naturalized in the s. of Europe, and in other warm regions of the globe. The genus *ricinus* belongs to the natural order *euphorbiaceæ*. It has panicled flowers, with 8 to 6-partite perianth; the fruit a tricoccus capsule, with one seed in each cell, the outside of the capsule generally covered with soft spines. The C. O. plant is often cultivated in gardens in the middle and even in the northern parts of Europe, where it is only an annual, attaining a height of 8 to 10 feet, but highly ornamented by its stately growth, its large, broad, palmato-peltate, 7 to 9-fid leaves,  $\frac{1}{2}$  to 2 ft. in diameter, and its generally purplish hue. Its flowers are produced in long glaucous racemes. In warmer climates, it is perennial, and its stem becomes arborescent, attaining even 80 ft. in height, with a corresponding thickness, so that ladders are used for climbing it. Different species which have been described, are probably mere varieties. It was known to the ancients, and appears to have been valued by them. Its seeds have been found in Egyptian sarcophagi. From the resemblance of its seeds to an insect called *ricinus*, it received that name from the Romans. The seeds are oval, and about four lines long. They are chiefly valued for the oil which they yield, on account of which the plant is cultivated in the Levant, Spain, Provence, the West Indies, Brazil, the United States of America, as far n. as New Jersey, and in other tropical and warm temperate countries.—Although C. O. is chiefly used in medicine, it is not unfit for lamps and for oiling the wheels of machinery. The streets of Lima are lighted and the machines used in the works of the sugar plantations of Peru are oiled with it. The appearance of the C. O. plant obtained for it the name of *palma christi*, by which it is still sometimes called. Its seeds were formerly known as *semina cataputia majoris*.

**CASTOR AND POLLUX**, twin gods of Greece and Rome; known under the name of Dioscuri (from Dios or Jupiter, and Kouroi, children); children of Jupiter by Leda, who met the divinity in his form of a swan. The Dioscuri were specially revered among people of the Dorian race, and were said to have reigned at Sparta. They presided over public games, Castor being the god of equestrian exercises, and Pollux the god of boxing; but both were usually represented on fiery steeds, with spears, and egg-shaped helmets crowned with stars. They were the patrons of hospitality, and their aid was especially sought by travelers, to whom they were always gracious. Among their exploits were the invasion of Attica to rescue their sister Helen from Theseus; their part in the Calydonian hunt; their participation in the Argonautic expedition during which they married the daughters of Leucippus; and lastly their battle with the sons of Aphareus, in which Castor (the mortal brother) was slain by Idas. On finding him dead, Pollux, who was immortal, implored Jupiter to permit him also to die; but

Homer says the dead one was permitted to live again on condition that both should, on alternate days, descend to Hades, or that they should live only on alternate days. Another story is that they were placed among the stars, and now, as the Twins, form one of the 12 zodiacal signs. They were greatly venerated at Rome, where it was believed that at the battle of lake Regillus they fought at the head of the legions of the commonwealth, and afterwards with incredible speed carried to the city the news of the victory. Where they alighted near a well in the forum, a temple was built, and a great festival was held in their honor during the idea of Quintilis, the supposed anniversary of the battle, where sacrifices were offered at the public charge. A part of the ceremonies was a grand muster of the equestrian body, when all the knights, clad in purple and crowned with olive, assembled at the temple of Mars, out of the city, and rode in state to the forum where stood the temple of the twins. For centuries this pageant was one of the most splendid sights in Rome. In the days of Dionysius the cavalcade consisted of 5,000 horsemen, all persons of wealth and honorable repute.

**CASTOR AND POLLUX**, the two principal stars in the constellation Gemini (q.v.), were so called from Castor and Pollux, sons of Leda and Tyndareus, king of Lacedæmon. Their sister was the famous Helen of Troy. On account of their mutual attachment, Zeus placed them among the stars.

**CASTOR AND POLLUX**, the name given to a meteor, seen at sea, and which, under the form of twin balls of fire, attaches itself to the masts of ships. Sailors predict fair weather from its appearance. Sometimes, however, only one ball of fire is seen; the meteor is then called Helena, and it is regarded as foreboding a storm. Shakespeare makes mention of this superstition in the *Tempest* (act i. scene 2).

**CASTRAMETATION** is the art of encamping; and a *camp* is the result of that art. See **CAMP**.

**CASTRATION**, taking away or destroying the natural powers, or the essential organs of generation in animals; in males the removal of the testicles, and in females a mutilation or removal of the ovaries, commonly called "spaying." The general purpose is to make domestic animals more docile and useful, and more valuable for meat, as well as to restrict unlimited reproduction. These advantages are counterbalanced in part, at least, by the fact that castration diminishes the powers of endurance and the quickness of the intelligence. Castration may be performed at almost any age, but the effects of it are more pronounced if it be done before the age of puberty. With regard to the castration of human beings, see the article **EUNUCH**.

**CASTREJON, ANTONIO**, an eminent Spanish painter, was born in Madrid in 1625. His pictures show great versatility in their choice of subject and method of treatment, comprising scenes of an heroic nature as well as those of a domestic character. He was especially remarkable as a colorist. His best-known picture is his "Michael Warring with the Dragon." He died in 1690.

**CASTREN, MATTHIAS ALEXANDER**, the greatest authority in regard to the Finnish people and language, was b. in 1813, not far from the Lappish boundaries of Finland. He received his earliest instruction in the town of Tornæa, and afterwards studied at Helsingfors. About the year 1838, he undertook a pedestrian excursion through Finnish Lapland, in order to extend his knowledge of the language and literature; and, in 1840, another through Carelia, to collect ballads, legends, etc., illustrative of Finnish mythology. On his return, he published in Swedish a translation of the famous Finnish poem, *Kalevala*, the meter and style of which have been imitated by Longfellow in his poem of *Hiawatha*. Aided by the government of his native province, he commenced his researches among the Finnish, Norwegian, and Russian Laplanders, as also among the European and Siberian Samoyeds. Appointed linguist and ethnographer to the St. Petersburg academy, C., between the years 1845 and 1849, prosecuted his laborious investigations as far e. as China, and as far n. as the Arctic ocean. On his return, he was appointed first professor of the Finnish language and literature at the university of Helsingfors. He employed himself in preparing for publication the vast materials which he had collected, but died 7th May, 1852, from exhaustion—a martyr to science. Before his death, appeared *Versuch einer ostjåkischen Sprachlehre nebst kurzen Wörterverzeichnisse* (Petersburg, 1849), as the first installment of his *Northern Travels and Researches*. He also wrote *Elementa Grammaticæ Syriacæ* (Helsingfors, 1844), and *Elementa Grammaticæ Tcheremissæ* (1845); *On the Influence of the Accent in the Lappish Language* (Petersburg, 1845); *De Afficiis Personarum Linguarum Altaicarum* (Helsingfors, 1850), etc.

**CASTRES**, a t. of France, in the department of Tarn, is situated on both sides of the river Agout, 46 m. e. of Toulouse. The two parts of the town are united by two stone bridges. In the middle ages, C. was celebrated for its Benedictine abbey, the heads of which exercised a temporal sway over the place. Later, it was one of the strongholds of the reformed party, but it was forced to submit, and had its fortifications demolished in the reign of Louis XIII. C. has beautiful promenades, shaded by fine alleys of trees, and in the neighborhood is a remarkable rocking-stone, 11 ft. high, and weighing some 30 tons. It is of egg-shape, and rests upon its smaller end; a strong push is sufficient to cause its vibration. C. is a busy manufacturing place. Its fine wool-dyed goods are

especially famous, and it has also manufactures of linen, leather, paper, soap, etc. Pop. '91, 27,509.

**CASTRI**, or **KASTRI**, a village of modern Greece, in the government of Phocis, situated on the s. declivity of Mt. Parnassus, and worthy of notice as occupying a portion of the site of the ancient Delphi (q. v.). The famous Castalian spring, now called the fountain of St. John, is situated between 200 and 300 yards to the e. of the village. Beside it grows a plane-tree, the only one in C., which is fabled to be that planted by Agamemnon.

**CASTRO** (ancient *Mitylene*), a seaport t. of Asiatic Turkey, capital of the island of Mitylene, situated on the e. coast, about 55 m. n.w. of Smyrna. It is surrounded with walls, and defended by a castle, and its streets are narrow and dirty. Pop. 6500.

**CASTRO**, a co. in n.w. Texas, formed 1876; organized in 1891. It is drained by Red river; 900 sq. m.; pop. '90, 115. Co. seat, Dimmitt.

**CASTRO**, **GUILLÉN DE**, 1569-1681; a Spanish dramatist who enjoyed the friendship of Lope de Vega, whom he assisted in the famous festival of the canonization of San Isidoro, where he won a prize in the literary tournament. Castro wrote about 40 plays, the most celebrated of which was *Las Mercedes del Oid*, to which Corneille was greatly indebted for the materials of his renowned tragedy. It is said that Castro died in poverty and was buried by charitable friends.

**CASTRO**, **HENRY**, 1786-1861; a native of France, an officer of the national guard of Paris, who, after the downfall of Napoleon, emigrated to the United States, and in 1827, was consul for Naples at Providence, R. I. He returned to Paris 11 years later, became a partner in the counting-house of Lafitte, and was made consul-general for the new republic of Texas. He engaged in the business of sending out emigrants, and within a few years established at Castroville and other places settlements which, after the annexation, were organized into Medina county.

**CASTRO**, **INEZ DE**, whose mournful fate is the subject of several tragedies and poems, was the daughter of Pedro Fernandez de Castro, and sprang from a branch of the royal family of Castile. She was appointed lady-in-waiting to the wife of Dom Pedro, son of Alfonso IV. of Portugal. Her beauty captivated Dom Pedro, and, after the death of his wife, in 1345, he secretly married Inez. Their stolen interviews took place in the convent of St. Clara, at Coimbra, until the secret was discovered and revealed to the king, who was made to believe that this union might prove injurious to the young Ferdinand, son of Dom Pedro by his deceased wife. Questioned by his father, Dom Pedro had not the courage to reveal the whole truth, while he refused to marry another. In the king's council, it was determined that Inez must die. To see this sentence executed, the king hastened to Coimbra, while his son, Dom Pedro, was engaged in hunting (1355); but the sight of the beautiful Inez, who, with her children, cast herself at the feet of the king, and prayed for mercy, diverted him for a few moments from his purpose. His advisers, however, soon obtained from the king permission to execute the sentence, and, in the course of an hour after the interview, Inez fell pierced by the daggers of assassins. Dom Pedro attempted a revolt against his father, but was pacified by the queen and the archbishop of Braga, and promised not to seek revenge for the death of Inez. Two years afterwards, the king died, having shortly before his death recommended the murderers of Inez to leave Portugal, and seek shelter in Castile, where Peter the Cruel was then ruling. As several of Peter's nobles had escaped into Portugal, to avoid his oppression, he now proposed to Dom Pedro an exchange of fugitives, to which the latter (then king of Portugal) consented. Two of the assassins accordingly were delivered up, and were tortured and burned. Two years afterwards, the king, in an assembly of the nobility, declared that he had been lawfully married, by papal sanction, and in the presence of the archbishop of Guarda, to Inez de Castro. When this statement had been confirmed by several testimonies, the king gave orders that the corpse of Inez should be removed from its grave, clothed in royal attire, with a crown on the head, and seated on a throne, should receive homage as queen. This strange ceremony was performed, the nobles of Portugal bowing before the enthroned dead, and kissing the hem of the royal robe. The body was then removed to Alcobaca followed by the king, with the bishops and the nobility, all on foot. A splendid marble monument was erected over the grave of Inez, surmounted by her statue, wearing a crown.

**CASTRO**, **João DE**, 1500-48; viceroy of the Portuguese Indies, son of the civil governor of Lisbon. He served in a military capacity in Tangier, Tunis, and elsewhere, and went to the Indies with his uncle, Garcia de Noronha. On arriving at Goa he enlisted among the "bravest of the brave" who were told off for the relief of Diu (a Portuguese settlement on an island of the same name, in the present province of Guzerat). Returning to Portugal he was made commander of a fleet to clear the European seas of pirates; and in 1545 he was sent out as viceroy of the Indies to supplant Martin de Souza. The next three years were full of struggle, suffering, and triumph. Valiantly seconded by his two sons, one of whom was killed before Diu, he overthrew Mahmoud, king of Cambodia, relieved the beleaguered town of Diu, and defeated the great army of Adhel Khan. He subsequently completed the subjugation of Malacca, soon after which he was fully commissioned as viceroy, but did not live long to fill the place, dying the next year in the arms of his friend, St. Francis Xavier. He was buried at Goa, but the body was after-

wards removed to Portugal, to be interred under a splendid monument in the convent at Bemfica.

**CASTRO DEL RIO**, a t. of Andalusia, Spain, situated on a slope on the right bank of the Guadajocillo, 16 m. s.e. of Cordova. A portion of the old town is surrounded by ruinous walls; the new town lying outside of these has some good streets. It has manufactures of woolen and linen fabrics, earthenware, etc., and considerable trade in agricultural produce. Pop. '90, 11,290.

**CASTRO-GIOVANNI**, a t. of Sicily, in the province of Caltanissetta, is situated 18 m. n.e. of the chief town of the province, on a remarkably fertile plateau, which rises precipitously to a height of 4,000 ft. above the sea-level. Castro-Giovanni occupies the site of the ancient *Enna*, of which Ceres was the presiding goddess, and her most famous temple was here. The neighborhood was the scene of Proserpine's abduction by Pluto. In connection with the Punic and Servile wars, Enna has a conspicuous part in early history. There are no remains of the old town. A castle and other buildings of Saracenic origin are still standing. The district yields large quantities of sulphur. Pop. about 19,000.

**CASTRONUOVO**, a t. of Sicily, in the province of Palermo, 25 m. n. of Girgenti. It is situated on a hill, is fortified, and in its vicinity are quarries of fine marble. Pop. 5,000.

**CASTROVILLA'RI**, a t. of s. Italy, in the presence of Cosenza, 84 m. n. of Cosenza. It is situated on an eminence surrounded by mountains, is partially fortified, and has an old massive castle, and a trade in wine, manna, silk, etc. Pop. 10,000.

**CASTRUCCIO CASTRACANI**, 1283-1328; a Ghibelline exiled at an early age with his parents and others of that faction; orphaned at the age of 19; served as a soldier in England, France, and Lombardy, until in 1318 he returned to Italy and was chosen chief of the Ghibellines, who had obtained mastery over the Guelphs. Thenceforth he passed a stormy life, chiefly in the support of the emperor Louis V., whom he accompanied to Rome, and who made him duke of Lucca, count of the Lateran palace, and senator of the empire. Castruccio was excommunicated by a Guelphic legate, and died soon afterwards, leaving several children, whose fortunes were wrecked in the Guelphic triumph that followed his death.

**CAST-STEEL**. This term, until lately, was confined to steel made by melting blister-steel (q. v.), obtained by the old cementation process. Through this simple operation of melting it in crucibles, which was invented by an Englishman named Huntsman about the middle of last century, steel was first readily made perfectly homogeneous, and fitted for the production of the finer kinds of tools and cutting instruments. The crucibles are made of fire-clay, mixed with a small proportion of the material of old ones and coke. They are very carefully prepared and annealed, but notwithstanding this, the heat of the furnace is so high that they can only be three times used. Each crucible contains from 80 to 40 lbs. of steel, which is poured, when melted, into cast-iron ingot-molds previously smoked. The name "cast-steel," however, can no longer be confined to steel so made, because Bessemer steel, although produced by a quite different process, is truly a cast-steel. In Sheffield, the finer kinds of cast-steel are now sometimes called "crucible steel;" but since puddled steel, which, like the Bessemer, cannot be used for fine cutlery, is also cast in crucibles, such a term is not distinctive. See IRON.

**CASTUE'RA**, a t. of Estremadura, Spain, 68 m. e.s.e. of Badajoz. It is situated near the right bank of the Guadalefra, has several good streets, manufactures of brick, earthenware, etc., and a trade in agricultural produce; there is also some weaving carried on. Pop. 7100.

**CASUAL POOR** are persons temporarily relieved without being admitted to the roll of permanent paupers. See POOR-LAWS.

**CASUALTIES OF SUPERIORITY**, in the feudal law of Scotland, are such enrolments arising as to the superior as depend on uncertain events. See WARD-HOLDING.

**CASUARINA**, a genus of trees of the natural order *amentacea*, and of the sub-order *casuarinea*, which is regarded by some as a distinct natural order. The trees of this genus are almost exclusively Australian; one only, *C. equisetifolia*, being found in the South Sea islands, the Indian archipelago, the Malayan peninsula, and on the e. side of the bay of Bengal, as far n. as Arracan. Some of them are large trees, producing timber of excellent quality, hard and heavy, the *beef-wood* of the Australian colonists, so called from the resemblance in color to raw beef. *C. equisetifolia* is called in Australia the SWAMP OAK. It is a lofty tree, the *toa* or *aitoa* of the Society islands, where it grows chiefly on the sides of hills, and where its wood was formerly used for clubs and other implements of war. It has been introduced into India, and is there much valued, as its wood bears a great strain, and is not readily injured by submersion in water. The hardness and durability of this wood led the earlier voyagers to the South Sea islands to designate it *iron wood*. *C. quadrivalvis* is the SHE OAK of New South Wales. **CASSOWARY TREE** is a popular generic name of the *casuarina*. Some of the species are scrubby bushes. All of them have a very peculiar appearance, their branches being long, slender, wiry, drooping, green, jointed, with very small scale-like sheaths instead

of leaves. They resemble arborescent *equisetacea*. The fruit consists of hardened bracts, collected in a *strobilus*, or cone, and inclosing small winged nuts. The flowers have neither calyx nor corolla; the stamens and pistils are in separate flowers, the male flowers with only one stamen, the female flowers with a one-celled ovary, the male flowers in spikes, the female flowers in dense heads. More than 20 species are known.

**CASUISTRY**, called by Kant the *dialectics of conscience*, is that branch of theology and morals which professes to deal with very delicate moral questions—*casus conscientia*—and which supplies rules and principles of reasoning for resolving the same; drawn partly from natural reason and equity, and partly from the authority of Scripture, the canon law, councils, fathers, etc. C. has been, and still is, studied chiefly by Roman Catholic theologians; but at one period Protestant divines also paid some attention to the perilous science. The rudiments of it, however, are to be sought for in antiquity. Traces of it are found in the Stoic philosophers of ancient Greece. This is not to be wondered at, for C. is not, in its essence, a device of the schoolmen, although the latter elaborated it into a science, but a natural expression of the intellect and moral nature of man, when he is placed in circumstances of great perplexity. The sound and healthy reason of antiquity, however, could not enter into the morbid refinement, or rather the insidious corruption of morals found in certain Jewish and Christian writers. The *Talmud* (q.v.) contains an enormous accumulation of casuistical questions, while the sphere of Christian ethics in the middle ages often became a mere arena for unprofitable and pernicious disputations of this nature, as is seen in such works as the *Summa Raymundiana*, *Summa Astesana*, *Summa Bartholina*, which obtained their names from their respective compilers. At a later period, the Jesuits Molina, Escobar, Sanchez, Busenbaum, etc., were accused of a gross abuse of ingenuity in the construction of moral puzzles, and of very flagrant immorality in their solutions. Some of them still “suffer the vengeance” of Pascal’s immortal satire. It is nevertheless indubitable, that in the life of every man—now as formerly—*casus conscientia* will at times arise, when the higher laws of morality come into collision with subordinate conventional ones. The dubiety as to what the path of duty is, what *ought* to be done, resulting from this collision, naturally and legitimately leads to many nice considerations. If these are carried on under the guidance of a pure conscience, no harm can ensue, but, on the contrary, much good. Such, however, is not the alleged C. of the Jesuits, “the art of quibbling with God,” as M. Le Fevre, preceptor to Louis XIII., called it, in which a man seeks to justify, by subtle quirks, his immoral actions. Mayer has published an account of all the writers on cases of conscience, ranging them under three heads—Lutheran, Calvinistic, and Romish.

**CASUS BEL'LI**, or a case of war, is the reason alleged by one power for going to war with another. It is found impossible to reduce these causes or reasons to any definite code, because an ambitious or aggressive power has no difficulty in *making* a reason to declare to others, without acknowledging the real reason.

**CASWALL**, HENRY, D.D., 1810-70; b. in England, and emigrated to the United States at the age of 18, graduating at Kenyon college, Ohio. After some years of service as minister and professor of theology, in 1842 he returned to England, and procured a private act of parliament recognizing the validity of his ordination in the United States. He was appointed vicar, became proctor, and prebendary of Salisbury cathedral. About 1868, he returned to the United States, and he died in Franklin, Pa. He wrote *America and the American Church*; *Scotland and the Scottish Church*; *The Western World Revisited*; *The Martyr of the Pongas*; and two works on Mormonism.

**CASWELL**, a co. in n. North Carolina, on the Virginia border, watered by the tributaries of the river Dan, and intersected by the Southern railroad; 410 sq. m.; pop. '90, 16,028, includ. colored. The chief productions are tobacco, corn, oats, and wheat. Co. seat, Yanceyville.

**CASWELL**, ALEXIS, D.D., LL.D., 1790-1877; one of the corporators of the national academy of sciences. He was professor of mathematics in Brown university from 1828 to 1850, and of mathematics and astronomy from 1850 to 1864, and president from 1868 to 1872. Author of mathematical works and of a *Memorial of John Barstow*.

**CASWELL**, RICHARD, 1729-89; a revolutionary officer, native of Maryland, but an early settler in North Carolina, where he was for many years a member of the colonial assembly, speaker of the house, treasurer of the state, first governor, and thrice re-elected. He was a delegate to the convention that framed the federal constitution, and in 1787, was speaker of the state senate, and was presiding in that body when he was stricken with fatal paralysis. He was a brig.gen. in the patriot armies, and shared in the battle of Camden, and other conflicts.

**CAT** (Lat. *catus*), a name sometimes extended to the whole family of quadrupeds designated by zoologists *felidae* (q.v.), the genus *felis* of Linnaeus; and sometimes more restrictedly applied to a section of that family, containing a number of its smallest species, the domestic C. and species most nearly allied to it. These form the subject of the present article. They all pursue their prey on the branches of trees more than on

the ground, and are most expert climbers, in which, however, they are rivaled by some of the other *felids*. See St. George Mivart, *The Cat* (1890).

The origin of the domestic C. is by no means well ascertained; and by some naturalists it is described as a distinct species, under the name *felis domestica*, which perhaps may be regarded as at least a convenient provisional designation, until satisfactory reasons can be adduced for referring it to some species existing in a wild state. By many, indeed, the domestic C. has been confidently pronounced to be a mere domesticated variety of the common wild C. (*felis catus*) of Europe and the n. of Asia; but to this there are many objections; the most important being that it is always of smaller size, contrary to what is usually observed of the effects of domestication in animals; and that in cats of the domesticated race which have run wild, and in their known progeny, there is no appearance whatever of a tendency to return to the type of the true wild cat.—Another opinion as to the origin of the domestic C. has obtained the assent of a considerable number of naturalists; that it is derived from the *felis maniculata*, or gloved C. of n. Africa, a species discovered by the celebrated traveler Rüppell. But Mr. Owen has stated a perfectly conclusive reason against identifying the domestic C. with the *felis maniculata*, that the first deciduous molar tooth in the latter has a relatively thicker crown, and is supported by three roots, whilst the corresponding tooth both of the domestic C. and of the wild C. of Europe has a thinner crown, and only two roots.

The certainty, however, that the C. existed as a domestic animal in ancient Egypt, makes it not improbable that we ought to look for its origin on the banks of the Nile, or in some of the countries from which the ancient Egyptians might most readily have obtained it. Of its rarity in Britain in former times, when the wild C. was common in all the woods which covered so much of the island, a curious evidence is afforded by a Welsh law quoted by Pennant—a law of the reign of Howel the Good, who died in 938 A.D.—fixing the prices of cats according to their age and qualities, beginning with a price for a kitten before it could see, and enacting that if any one stole or killed the C. that guarded the prince's granary, he was to forfeit a milk ewe, its fleece and lamb; or as much wheat as when poured on the C. suspended by its tail, the head touching the floor, would form a heap high enough to cover the tip of the tail.

It is needless to describe an animal so well known as the domestic C., or to do more than allude to its purring, its mewing, and the other sounds which it makes, its aversion to wet its feet or fur, its love of heat and comfort, its stealthy manners when in quest of prey, its patient watchfulness, so often fatal to mice, and other points of its natural history with which everybody is familiar.

The delight which a C. takes in tormenting a mouse before killing it, has sometimes been mentioned as an apparent exception to the general character of goodness manifest in the instincts of animals. It is an interesting circumstance, however, that when the prey is a bird instead of a mouse, a C. immediately inflicts a mortal wound, as if aware of its greater power of effecting its escape.

The eye of the C. is capable of much contraction and dilatation of its pupil, so that the animal can see in a very feeble light, and is thus adapted for those nocturnal habits to which, even in domestication, it shows so strong a natural tendency.

The fur of the C. is very free from any oily substance, so as to be readily injured by water, and is capable of being rendered highly electric by friction, particularly in very dry or frosty weather. An electric spark is readily obtained from the tip of the ear.

The strong statements of Buffon gave for a time great currency to the opinion, that the C. is incapable of affection, and retains, even in a domesticated state, its savage ferocity, merely restrained by selfishness, and disguised by cunning. The belief is very prevalent that the C. forms an attachment to places only, and not to persons. There are, however, well-authenticated stories which prove the C. to be capable of strong attachment to its master or mistress, although this quality is less frequently and remarkably displayed than by the dog. The instances which have, on the other hand, been recorded to show the attachment of the C. to places, are well worthy of attention in connection with the subject of instinct in animals. Some of these instances of cats finding their way back from great distances to their former home, are very wonderful, and indeed cannot be explained on any grounds or principles known. The same instinct and power, are displayed by other animals. See Romanes, *Animal Intelligence* (1882).

The varieties of the domestic C. are neither numerous nor very different. The *tor-toise-shell* C. differs from the most common variety chiefly in color, although it is also particularly elegant and delicate in form. It is much more common in the s. of Europe than in Britain.—The *Angora* C. is a beautiful variety, remarkable for its long silky hair.—The *Chinese* C. has a fine glossy fur.—The *Chartreux* is of a bluish color.—The royal Siamese cat is fawn-colored, with blue eyes.—The *Manx* cat is tailless, and has longer hind legs. See illus., CARNIVORA, vol. III.

The wild C. is still to be found in a few of the woods of the n. of England, in the mountains of Wales, the Highlands of Scotland, and some parts of Ireland. It has entirely disappeared from districts where it was once common. It is the only beast of prey remaining in Britain the strength and fierceness of which make it at all dangerous to man; but an encounter with a wild C. is safe only to a man well armed. Fortunately, the instances of its attacking when unmolested are rare, but such instances have occurred. The wild C. is an inhabitant of deep thickets and recesses of woods, and of the rocky and

bushy ravines of mountainous districts. Its fur is held in considerable estimation. The fur is soft, long, and thick. The color of the face is yellowish-gray, with a band of black spots towards the muzzle; the forehead is brown; the head is gray, with two black stripes passing from the eyes, over and behind the ears; the back, sides, and limbs are gray, darker on the back, paler on the sides, with a blackish longitudinal stripe along the middle of the back, and numerous paler curved ones on the sides; the tail is ringed with light-gray and black, the tip being black. The length of a medium-sized male wild C. is almost 2 ft., exclusive of the tail, but this length is sometimes very considerably exceeded.—We know no record of any attempt to domesticate the wild cat.

The animal often called wild C. in America is the bay lynx. See LYNX.

*Superstitions regarding Cats.*—Cats have been objects of superstition from the earliest ages. In Egypt, they were held in the highest reverence; temples were erected in their honor; sacrifices and devotions were offered up to them; and it was customary for the family in whose house a C. died to shave their eyebrows. In the middle ages, they were regarded as the familiars of witches. The favorite shape of Satan was said to be that of a black C.; and the animal was an object of dread instead of veneration. There is or was a belief among sailors, that the frolics of a C. at sea portended a storm. Many people still prophesy rainy weather from a C. washing its face; and a cat-call on the housetop was formerly held to signify death. Their superstitious connection with witches, and the foolish belief that a C. has nine lives, have led to the perpetration of great cruelties upon this harmless and very useful domestic animal. See Brand's *Popular Antiquities*, Ellis's revised edition. See SUPERSTITION.

CAT, on shipboard, is a name for many of the ropes or lines employed. A *cat-fall* is a rope for heaving up the anchor from the water's level to the bow; it works through *cat-blocks*, and is connected with the *cat-head*. *Cat-harpings* are small ropes for tightening the shrouds. The *cat-heads*, just named, are two strong short timbers projecting from the bow, on each side of the bowsprit. A *cat-hook* fastens the ring of the anchor to the cat-block.

CAT, or CAT-CASTLE, in the military engineering of the middle ages, was a kind of movable tower to cover the sappers as they advanced to a besieged place. The garrison sometimes poured down burning pitch and boiling oil from the walls upon the C.; but occasionally this stratagem was disastrous, for the besiegers availed themselves of the blazing tower to burn the wooden gates of the town or fortress.

CATABAPTISTS (Gk. *kata*, against; *baptizein*, to baptize), a general name applied to those who deny the necessity of baptism. Zwingli (q.v.) applied the name to the Baptists, because they rejected the baptism of infants.

CATABRO'EA (Gr. *catabrōis*, a gnawing), a genus of grasses formerly included in *aira* (see HAIR-GRASS), but distinguished by the leathery *paleæ*, which are ribbed, truncated, erose (as if gnawed at the points), awnless, and nearly equal. The glumes are much shorter than the spikelets, membranaceous, and very obtuse. The general appearance is different from that of the genus *aira*.—*C. Aquatica* is a pretty common British grass. It is of very wide geographic and climatic range, being found throughout Europe, from Lapland to the Mediterranean, and also in the torrid regions of South America.

CATACHRESIS. See RHETORIC, FIGURES OF.

CATACLYSM, a term used by geologists to denote great and sudden deluges, such as the Noachian flood, or violent upheavals, which are supposed by some writers to have swept over certain countries. The existence of cataclysms is affirmed by some to account for various phenomena, such as the deposit of different formations of drift or diluvium, which ordinary currents or the action of ice to their minds seems inadequate to produce. Cataclysm comes thus to be equivalent to any sudden convulsion or alteration of physical conditions.

CATACOMBS (Gr. *kata*, and *kumbos*, a hollow), subterranean chambers and passages formed generally in a rock, which is soft and easily excavated, such as *tufa*. C. are to be found in almost every country in which such rocks exist, and, in most cases, probably originated in mere quarries, which afterwards came to be used either as places of sepulture for the dead or as hiding-places for the living. The most celebrated catacombs in existence, and those which are generally understood when C. are spoken of, are those on the Via Appia, at a short distance from Rome. To these dreary crypts it is believed that the early Christians were in the habit of retiring, in order to celebrate their new worship, in times of persecution, and in them were buried many of the saints and martyrs of the primitive church. They consist of long narrow galleries, usually about 8 ft. high and 5 wide, which twist and turn in all directions very much resembling mines; and at irregular intervals, expand into wide and lofty vaulted chambers. The graves were constructed by hollowing out a portion of the rock, at the side of the gallery, large enough to contain the body. The entrance was then built up with stones, on which usually the letters D. M. (Deo Maximo), or XP., the first two letters of the Greek name of Christ, were inscribed. Other inscriptions and marks, such as the cross, are also found. The original extent of the C. is uncertain, the guides maintaining that they have a length of 20 m., whereas about 6 only can now be ascertained to exist, and of these, many portions have either fallen in or become dangerous. When Rome was besieged by the Lombards in the 8th c., many of the C. were destroyed, and the



popes afterwards caused the remains of many of the saints and martyrs to be removed and buried in the churches. Art found its way into the C. at an early period, and many remains of frescoes are still found in them. After being neglected for centuries they were again brought to notice by father Bosio, who spent thirty years in their exploration. His investigations were published in 1683, two years after his death; but the most exhaustive treatise on the subject in all its aspects is the *Roma Sotterranea* of De' Rossi (1864-67), of which an abridgment is published in English by Dr. Northcote. The C. at Naples, cut into the Capo di Monte, resemble those at Rome, and evidently were used for the same purposes, being in many parts literally covered with Christian symbols. In one of the large vaulted chambers there are paintings, which have retained a freshness which is wonderful, considering the time and the dampness of the situation. The palm-tree, as a memorial of Judea, is a prominent object in these pictures. At Palermo and Syracuse there are similar C., the latter being of considerable extent. They are also found in Greece, in Asia Minor, in Syria, Persia, and Egypt. See NECROPOLIS. At Milo, one of the Cyclades, there is a hill which is honey-combed with a labyrinth of tombs running in every direction. In these bassi-rilievi and figures in *terra-cotta* have been found, which prove them to be long anterior to the Christian era. In Peru and other parts of South America, C. have been discovered. The C. in Paris are a species of charnel-houses. For illustrations of catacomb paintings, see illus., ROMAN ART, vol. XII.; see also illus., BURIALS, ETC.

**CATACOUSTICS.** See ACOUSTICS.

**CATAFALCO** (Ital. a scaffold), or **CATAFALQUE**, a temporary structure of carpentry intended to represent a tomb or cenotaph, and adorned with sculpture and painting. It was employed in funeral ceremonies. The most magnificent C. ever made, perhaps, was that used at the interment of Michael Angelo, at Florence.

**CATAHOULA**, a parish in Louisiana, on the Tensas, Black, and Saline rivers; 1890 sq.m.; pop. '90, 12,002, inclu. colored. The soil is fertile, producing corn, cotton, etc. Judicial seat, Harrisonburg.

**CATALAN.** See CATALONIA.

**CATALANI, ANGELICA**, a celebrated Italian singer, b. at Sinigaglia, Italy, in Oct., 1779. Her voice was strong and flexible, and she was educated in the convent of St. Lucien, where, in her seventh year, she displayed such wonderful vocal powers that strangers flocked from all quarters to hear her. She made her first public appearance at Venice in her 16th year, and experienced a succession of triumphs in every country in Europe for more than 30 years, amassing immense sums of money. The Italian opera in Paris was twice under her direction; but her husband's interference and extravagance brought her into much trouble. Her large queenly person and fine countenance, the immense volume, range, and flexibility of her voice, her power of sustaining her notes, in contrast with the lightness and facility of her unerring execution, everywhere took her audience by storm. Her expression, although fine, and her whole style, surprised rather than touched the heart. In concert singing, her great triumphs were in Rhode's air with variations, and *God Save the King*—which she pronounced *God Shave the King*—and in oratorios, Luther's hymn, her delivery of which, especially when her marvelous voice alternated with the trumpet's sound, was so sublimely awful, that the audience were hushed and pale, and some were borne away fainting. The throat from which these wondrous sounds proceeded was physically of such dimensions, that a physician, when called to look into it, declared he could have passed down a penny-loaf. In 1830, Madame C. purchased a villa near Florence, formerly belonging to the Medici family, where she gave free instructions to girls who had a talent for singing, on condition of their taking the name of Catalani. In the spring of 1849, when political disturbances broke out in Tuscany, she repaired with her daughters to Paris, where she died of cholera on the 13th of June.

**CATALAUNIAN PLAIN** (*Campi Catalaunici*), the ancient name of the wide plain surrounding Chalons-sur-Marne, in the old province of Champagne, France, celebrated as the field of battle where the west Goths, and the forces under the Roman gen. Aetius, gained a great victory over Attila in 451 A.D. A wild tradition (made the subject of a striking picture by Kaulbach, "*Die Hunnenschlacht*," or "*The Battle of the Huns*") tells that three days after the great fight, the ghosts of the fallen myriads appeared on the plain, and renewed the conflict.

**CATALEPSY** (*katalepsis*, a taking possession of), a state of more or less complete insensibility, with absence of the power of voluntary motion, and statue-like fixedness of the body and limbs in the attitude immediately preceding the attack, a like position being also retained, unless altered by force, until the return of consciousness. Such is the abridged description of C., as commonly given in works of authority. The patient is usually in good health at the time of seizure, or subject only to nervous affections, such as hysteria (q.v.); sometimes the attack is preceded by disappointment, fear, violent exciting or depressing passions, or even religious emotions, being in such cases only an extreme form of what is otherwise called trance, reverie, or ecstasy (q.v.); on other occasions, the apparent cause is more purely physical, as in some of the hysterical cases, depending on suppressed menstruation. In all cases of cataleptic rigidity and insensi-

bility, it may be presumed that the brain, as the organ of consciousness, is disturbed; but it does not appear that in any considerable proportion there is structural disease. Patients rarely die during the attack, which may, however, be protracted for an indefinite period, and may even endanger life indirectly by the debility consequent on imperfect nourishment. The circulation and respiration are, in most instances, little affected; cases, however, have been recorded in which, in consequence of their failure, the patient has been supposed to be dead. See DEATH. Many of the recorded cases of C. are little worthy of credit, and it has even been doubted whether this curious disease can ever be said to exist exempt from some degree of deception, or at least voluntary and conscious regulation of the muscles on the part of the person affected. The combination of C. with hysteria, and its frequent association with what are called the higher phenomena of mesmerism (see ANIMAL MAGNETISM), are undoubtedly circumstances of great suspicion; but it would certainly be wrong to suppose that all the cases described were fictitious, and not less so to classify them all under the head of pure imposture. Epidemic C. has been described, and in such cases it would appear plain that the principle of imitation, so powerful in producing nervous disease, must have been at work. The remedies of C. are the same as those of the states to which it is so nearly allied, and of which it may be said to form a part. Moral means form a large part of the treatment, as in hysteria. In some cases, it may become necessary to administer food by means of the stomach-pump, and this even for weeks or months.

CATALOGUE (Gr. a list). See BIBLIOGRAPHY, BRITISH MUSEUM, LIBRARY, STARS.

CATALONIA (Spanish, *Cataluña*), an old province and principality of Spain, now divided into the provinces of Barcelona, Tarragona, Lerida, and Gerona, the total area being 12,180 m., and the pop. '87, 1,838,799. C. occupies the north-eastern corner of Spain, having France on the n., and the Mediterranean on the e. and s.e. It is watered by the Llobregat and the Ter, and by some of the affluents of the Ebro, the last-mentioned river having its embouchure in Catalonia. The coast is rugged, its boldest promontories being capes Creus and San Sebastian, and its deepest indentations the bays of Roses and Tarragona. With the exception of a few low plains of limited extent, the soil of C. is that of a wild mountainous region formed by numerous offsets or terraces of the Pyrenees, one great ridge or series of ridges extending through the center of the province.

The terraces, sloping abruptly down to the coast, or to the narrow coast plains, are divided by the valley of Llobregat into the lower and the upper Catalonian mountains.

The climate of C., though fog and rain are frequent, and extreme and rapid changes of temperature prevail, is on the whole healthy and favorable to vegetation. Near Barcelona, oranges flourish in the open air; the fields in some parts are bounded by aloehedges, and olives grow on Montserrat. Cork-trees grow on the mountains, and thickets of thorn-apple, laurel, myrtle, pomegranate, box, rosemary, etc., extend where the cork has its limits. Northern upper C. has a more severe winter than the s.; but everywhere vineyards and olive-gardens cover the slopes, and cornfields extend in the valleys. Among the other products are hemp, flax, madder, barilla, and saffron. Hazel-nuts, a variety called Barcelona nuts, are extensively grown. Meadow-lands and pastures are comparatively rare, and horned cattle are, therefore, mostly confined to the districts bordering on the Pyrenees; while few horses and mules are kept; but sheep, goats, and swine are bred in considerable numbers. Silk-worms and bees are also reared. The coasts abound with fish, and game is plentiful. The minerals are coal, copper, manganese, zinc, lead, cobalt, salt, sulphur, and many varieties of marble.

C. is the principal manufacturing province of the kingdom—is, in fact, "the Lancashire of Spain." The inhabitants are neither French nor Spaniards, their language, costume, and habits being quite distinct from those of either; they have also local coins, weights, and measures. In energy, industry, and intelligence, they greatly surpass the rest of the Spaniards. On their language see SPANISH LANGUAGE AND LITERATURE.

C., under the name of *Hispania Tarraconensis*, was one of the earliest, and remained among the last of the Roman provinces. It was invaded and captured by the Alans, who were followed by the Goths, hence its name *Gothalania*, changed into Gothalanía or Catalonia. In the 8th c., the Arabs gained possession of the southern part. When Charlemagne, in 788, subjugated Spain as far as the Ebro, C. formed the central portion of the Spanish mark, governed by French counts, having Barcelona as their residence. They soon made themselves independent of France. In 1137, earl Raymund Berengar, by his marriage, united C. with Aragon; and the marriage of Ferdinand and Isabella (1469) united both with Castile, and so C. became a portion of the Spanish monarchy, but never a very peaceable one. In modern times it has repeatedly taken a prominent share in Carlist or other insurrections. See Balaguer, *Historia de Cataluña* (Madrid, 9 vols., 1885-87).

CATALPA, a genus of trees of the order *bignoniaceae*. The *catalpa syriensis* is a native of the s. portion of the United States, and is cultivated there and in the cities of the northern states as an ornamental shade-tree. It may be known by silver-gray bark, wide-spreading but few branches, and the fine pale green of its large heart-shaped leaves. The flowers are white, tinged with violet or purple, and dotted with the same colors. The flowers are succeeded by long bean-like pods, that sometimes hang on the

otherwise bare limbs all winter. The wood is light and of fine texture, and useful in cabinet work. There is a catalpa in London said to have been planted by lord Bacon.

**CATALYSIS** (Gr. dissolution) is a term applied in chemical physics to a force supposed to be exerted by one substance upon a second, whereby the latter is subjected to change or decomposition, whilst the former, or acting substance, remains comparatively unaltered, and does not combine with it. The force, indeed, has been ascribed to the mere "action of contact." Fermentation is an example of this force (see *BREK*), when one part of yeast acting upon the sugar of the sweet worts, without entering into combination with it, compels 100 parts of sugar to pass into alcohol and carbonic acid. Germination, or the sprouting of grain when placed in the ground, is another example where one part of *diastase* changes 1000 parts of starch into sugar.

**CATAMARAN**, in its original form, consists of three logs—the middle one being longest—lashed together; used by the natives of the Coromandel coast, particularly Madras; also used in the West Indies, and coast of South America. The Fiji Islanders developed this idea in their war-canoes, which consist of two parallel logs joined together with a platform on which a mast is placed. These boats are safe and very swift, having a speed of about fourteen miles an hour. This again is surpassed by the flying proa of the Ladrone Islanders, a boat with two hulls of unequal size. The larger hull, which carries all the rigging, is perfectly flat on one side and rounded on the other. On this are placed bamboo poles projecting beyond the rounded side, and to their ends is fastened a boat-shaped log, one-half or one-third the size of the larger hull. This prevents capsizing as effectually as the Fiji double canoe. Both ends of the proa are made alike and the boat is sailed with either end first; but the outrigger is always on the windward. The flat side of the hull, being always on the lee-side, acts as a centre-board. Against a head-wind the proa is kept away till the stern approaches the wind, when the yard is swung round, and what was the stern becomes the bow. Proas are from forty to sixty-five feet long and six or seven feet wide, and are said to attain a speed of twenty miles an hour. See *CANOE*.

Double boats, or catamarans, have often been built in this country, but have almost always proved very slow, because the water between the two bows is compressed into a narrowing space and offers great resistance. This defect is illustrated in the English twin steamer *Castalia*, which in spite of her great engine-power was a slow boat. Another example of a steam catamaran is the *Henry W. Longfellow*, built about 1880. Two iron cylinders two hundred feet long, shaped like cigars, sharp at both ends, were fastened to each other at a distance of nine feet. On them rested a deck 125 feet long, like a ferryboat. She could carry 475 passengers, had 500 horse-power, a displacement of 73 tons, and her entire weight was only 43 tons. In 1876 the *Amaryllis* was designed and built by Herreshoff. She consisted of two slender tubes connected by cross-beams loosely fastened together, and supporting a deck hardly more than large enough for two men. She was entered at the Centennial Regatta, at New York, and easily beat all competitors, but was ruled out on account of her construction. In spite of her great speed, she was very uncomfortable and very unsafe. In 1877 Herreshoff patented a double-hulled boat combining the greatest stability with least weight. The hulls were united by ball and socket joints, which obviated the unevenness in position of the two hulls in a rough sea, and were set sixteen feet apart, each having a centre-board and rudder. The boat had a sloop-rig, and with a strong wind abeam and a smooth sea, made twenty miles an hour. Many catamarans have been built since, but generally with rigid connections, and prove unsatisfactory in rough water. In a racing catamaran 25 feet long the proportion is one foot canvas to eight pounds of water displacement. This shows the sailing powers of the catamaran. If in construction iron cylinders were used, in shape like the hulls of the flying proa, and placed with the flat sides toward each other, great speed would be secured with safety. Under proper conditions the catamaran is well adapted to summer sailing in smooth waters, being easy to handle, fast, and safe.

**CATAMARCA**, a province in the Argentine republic, between 25° and 29° s., and 66° and 69° w., lying at the foot of the Andes; 31,500 sq.m.; pop. '95, 90,187; the greater portion being of pure Indian blood. The province is intersected by several mountain-chains; and by many small streams, most of them dry in the summer, but in winter subject to destructive floods. Some of the plains are sandy deserts, while others are periodically inundated; and when the water dries away, it leaves a coating of salt, which is gathered for home use and for trade. Gold, silver, and copper are found, the latter in abundance; and nearly all the fruits and grains of tropical and temperate regions are grown. The cotton of C. is especially esteemed.

**CATAMARCA**, the capital of the province of Catamarca, in the Argentine republic, 28° 20' s., 66° 25' west. It is a regular and moderately well-built town of about 7500 inhabitants. Of public buildings, there are a town-house, a Franciscan monastery, and a convent. There is considerable import-trade of European goods, and the place is a center of distribution for a flourishing district. Dried figs, wines, brandy, and cotton are the principal articles of export.

**CATAME'NIA**. See *MENSTRUATION*

**CATAMOUNT**. See *PUMA*.

**CATANIA**, or **CATANEA**, a city and seaport of Sicily, situated on the e. coast, near the foot of Mt. Etna, 81 m. n.n.w. of Syracuse. The fertile and well-cultivated neighborhood of C., extending along the s.e. base of Mt. Etna, is styled "the granary of Sicily," and has given to C. the title, "La Bella Catania." By eruptions of the great volcano and attendant earthquakes, the city has been several times almost entirely destroyed, especially in the year 1693; but out of its ruins it has always risen with increased beauty, and it is now the finest city in Sicily, being built throughout on a beautiful and consistent plan, from which no deviation is allowed. The harbor of C., formerly good, was choked by a stream of lava in 1693, and the mole was partly destroyed, so that now it has only a roadstead, which is guarded by a fort, and serves as a landing-place. It has several squares, the finest of which, in front of the cathedral, has a statue of an elephant sculptured in lava. Among its chief public buildings are the Benedictine convent and church of San Nicolo, with one exception the grandest structure of the kind in Europe; the town-hall; the cathedral, with its noble granite columns; and the university, founded in 1445. It has besides many handsome churches and convents, and several educational and charitable institutions, and is the seat of one of the three high courts in the island. The inhabitants, formerly much more numerous, amounted in 1894 to 123,100, and are distinguished by their commercial spirit and industry. C. has manufactures of silk and linen goods, and of articles in amber, lava, wood, etc. Among the remains of ancient times, that earthquakes have spared, are those of a theater, an odeum, a temple of Ceres, Roman baths, and an aqueduct. C., anciently known by the name of *Catana*, was founded by a Greek colony of Chalcidic origin, in the latter part of the 8th c. B.C.; and as early as the beginning of the 5th c. B.C. it was esteemed one of the most flourishing towns in Sicily. It was taken by the Athenians under Nicias, and was desolated by Dionysius I.; but again rose under the Roman sway into its former importance. Augustus here founded a Roman colony. It suffered at the hands of the Goths, but once more, under the Byzantine empire, became one of the principal cities in the island. C. gives name to the province of which it is the capital, and which is one of the richest in Sicily, with an area of 1917 sq. miles, and a pop., in 1895, of 672,025.

**CATANIA**, **GULF OF**, an inlet of the Mediterranean, on the e. coast of Sicily, extends in the form of a semicircle from La Trezza bay to cape Santa Croce, a distance of 18 miles. It is about 10 m. deep, and receives the river Giaretta.

**CATANZARO**, a city of s. Italy, in the province of the same name, is beautifully situated on the declivity of a rocky hill, near the gulf of Squillace. On account of its agreeable climate, many wealthy families have made it their residence. It has a cathedral. Pop. about 25,000. Pop. of province in 1895, 467,186.

**CATAPLASM** (a Greek term for a poultice), an application to diseased or painful parts, for the purpose of promoting suppuration, relieving pain, and stimulating or soothing the skin, according to circumstances. A C. may be composed of any moist pulpy substance of sufficient consistence to retain the water without dripping or soaking through the thin muslin covering in which it is generally wrapped. The making of a poultice well is a matter of some nicety, and unless the proper consistence is given to the mass, the application is apt to do more harm than good. The linseed-meal poultice is the most easily made, and most satisfactory of all soothing applications. The meal is stirred gradually into a sufficient quantity of boiling water, placed in the bottom of a small basin or teacup, until a perfectly smooth pulp is formed of the proper consistence, and in quantity sufficient to cover completely, to the thickness of three quarters of an inch, the whole pained part. The pulp is then folded up in muslin or thin calico, and applied as soon as the heat will permit it to be borne. The bread and milk, or even bread and water poultice, is also very good; as is also the oatmeal-porridge poultice, to which a little butter may be added with advantage. A spoonful or two of yeast may be added, if there are foul discharges, or peat charcoal may be sprinkled on the surface of the poultice before it is applied. Carrot poultices are in great favor with the people in some parts of the country. Hemlock poultices, made of the fresh leaves, or of the dried leaves, with the aid of some powder of the leaves, form a valuable sedative application in painful diseases; and poppy-heads, or even opium, are sometimes infused in the water of which a poultice is made, for the same purpose. A stimulating C. or poultice may be made by sprinkling oil of turpentine, or chloroform, or mustard in moderate quantity on the surface of any ordinary poultice. When considerable irritation of the skin in a short time is desirable, a mustard C. or sinapism (*sinapi*, mustard) is used.

**CATAPULTA**, an engine of war used by the ancients, somewhat resembling the crossbow. In the C., a string or rope, suddenly freed from great tension, gave a powerful impulse to an arrow placed in a groove. There were great catapultas fixed upon a scaffold with wheels, which were used in sieges, and small ones, carried in the hand, which were employed in the field. See **BALISTA** AND **ARBALEST**. See illus., **BATTERING RAMS**, vol. II.

**CATARACT**, an opaque condition of the lens of the eye. It is readily distinguished from opacities of the cornea, or clear front part of the eye, by its position just behind the pupil—that round and varying aperture in the iris through which light is admitted

into the back of the eye. C. may affect the lens alone (lenticular C.), or the front or back of the capsule of the lens (capsular C.), or both lens and capsule (capsulo-lenticular cataract). Its whiteness varies from that of half-boiled white of egg to that of snow. Heat will produce a like change on the lens out of the body, just as it changes white of egg from transparent to opaque. The rounded lens of the fish is seen at table in this opaque condition.

C. is painless, and unaccompanied by inflammation. It occasions blindness simply by obstructing the passage of the light; but C. alone does not produce so complete blindness but that the patient can tell light from darkness. It may occur at any age, but is most common in elderly persons, and is not unfrequent in children, who may be even born with it. The catoptric test, now disused, was an ingenious method of distinguishing incipient C. from certain other deep affections of the eye. When a lighted candle is held before the eye of a person whose back is to the window, three candles are seen in the healthy eye. Two are erect—the large front one caused by the convex cornea, the smaller and fainter one behind by the convex front of the lens. The third, occasioned by the concave back of the lens, is in the middle; is small, bright, and turned upside down; and, when the candle is moved, goes in the opposite direction, while the two erect images move with the candle. When the back of the lens becomes opaque, the inverted image is obscured or disappears; and when the front of the lens is affected, only the great front image, caused by the cornea, remains. At the present time, cataract is accurately detected by concentrating light upon the eye and illumining its interior by means of the ophthalmoscopic mirror, the eye being previously dilated by some mydriatic, such as duboisine or atropine. No difficulty then arises in determining at once the nature of the disease.

No medical or other treatment has any influence in arresting the progress of C., nor can it be cured but by a surgical operation. A clever imposture used to be practiced by quacks. By applying belladonna to the eye—as the surgeon does when he wishes to dilate the pupil for an examination or operation—some little light was temporarily admitted through the less opaque edge of the lens. The patient beginning to see somewhat better, after long and increasing dimness of vision, began to congratulate himself on a cure; the quack, of course, hastened to get his money without waiting for the further result, which was sure to be blank disappointment. So long as there is fair vision with one eye, the operation on the other may be delayed. It is a mistake to delay the operation in children on account of their tender age. The sooner it is done the better, both for the eye and the education of the child.

Three methods of operation are practiced. 1. For *absorption* or solution. This is suitable for children, in whom the C., like the natural lens, is soft, and in all other cases in which there is reason to suppose that the C. is soft. An appropriate needle is passed through the cornea; made to open and lacerate the front of the capsule, the rags of which curl out of the way behind the iris, so that their subsequent opacity does not obstruct the light; then the soft cataractous lens is punctured and picked so as more effectually to admit the aqueous humor, which naturally fills the space between the lens and the cornea, and which has the remarkable property of absorbing or dissolving the lens or cataract when admitted within the capsule. This operation may require to be repeated several times, at intervals of a few weeks, before the whole C. is dissolved. 2. *Displacement*. A needle is passed through the fore part of the white of the eye, until it is seen through the upper part of the pupil, lying across the front of the upper part of the lens. This is now pressed back, so as to make the lens sink down and back into the vitreous humor, when it is either slowly absorbed, or may in part permanently remain. The older method of displacement, termed couching, in which the lens was pushed more directly downwards, is now abandoned, as more likely to press on the retina, and cause subsequent evil to the eye. 3. *Extraction*. Half the cornea, through nearly its whole breadth, is divided by an incision, an operation requiring great skill; the front of the capsule is opened, and disposed of with a needle; and the lens is gently assisted out of its place, through the pupil, and out of the opening in the cornea, great care being taken not to allow the vitreous humor to follow. Displacement and extraction are both applicable to hard cataracts, the form it generally takes in old age, as the lens itself becomes naturally harder with age, as well as more flat and amber-tinted. Displacement is more likely to be followed by bad consequences, some time after, from the presence of the displaced lens, while the risk of extraction is greater at the operation. The surgeon must decide which is best for each case. Though not so simple and successful as the operation for absorption through the cornea for soft C., displacement and extraction are generally very successful in restoring vision. The place of the lens is supplied by fluid humor, the refracting power of which is nearly equal to that of the lens, and the restoration of vision may be perfect. All of these operations require minute anatomical knowledge (see EYE), and great nicety and skill in the use of the instruments.

**CATARACTS AND RAPIDS.** See WATERFALLS.

**CATARH** (Gr. *katarrho*, I flow down), a disease of great frequency in temperate latitudes, especially in changeable moist climates in the winter season. From its well-known connection with sudden falls of temperature, and other epidemic or atmospheric causes (see INFLUENZA), as also from the chill often experienced at the commencement

of the disease, it is popularly called a *cold*—a term, however, perhaps somewhat less definite in its meaning than *C.*, which word is usually restricted to the case of a cold affecting the chest, and attended with discharge of mucus by coughing. A “cold in the head” is termed, in strict scientific language, *coryza*; we shall, however, keep both forms in view in the present article. *C.*, or cold, commonly begins with a feeling of chilliness, which may or may not be attributable to external causes. Sometimes this is absent, there being only a sense of languor and indisposition; not unfrequently there is no sensation of an unusual kind, until a stuffing is experienced in the nostrils, or severe headache, or hoarseness with cough, or oppression of the breathing. The regular form of a cold is to attack the nostrils first, and afterwards the air-passages leading to the chest. When it habitually attacks the chest, without running through its ordinary course as indicated above, there is often some special cause of delicacy in the lungs, or some constitutional tendency towards consumption (q.v.). The discharge is in the beginning watery, becoming afterwards more abundant, glairy, and of yellowish color; the early stages of the disease are attended by considerable irritation of the surfaces affected, and probably no one of the little miseries of life is more prostrating and discouraging for the time than a bad cold in the head. The tendency of *C.* to attack the chest, and thus to pass into bronchitis or pneumonia (q.v.), or to lay the foundation of tubercular disease, constitutes almost its only danger. See *CHREST*.

The treatment of a cold is commonly a simple matter, so far as the particular attack is concerned. Confinement to the house, and, in severe cases, to bed, or to the sofa, for a day or two; a warm hip or foot bath, to remove the chill; light farinaceous diet, and, if the stomach and bowels are at all loaded, a dose or two of some gentle laxative, are commonly sufficient to subdue the disease. Some persons cure their colds by entire abstinence from food, and as much as possible from drink; others by a large opiate, or by a succession of doses of Dover's powder; others by spirit of mindererus and paregoric; some even profess to carry out the popular maxim, “stuff a cold, and starve a fever,” and maintain that a good dinner, and a tumbler of whisky or brandy toddy, are the best specifics. That colds get well under all these methods, needs not be denied; but that any violently perturbative or specific practice assists the cure, or shortens the disease, has yet to be proved; and multiplied experience has shown, that “stuffing a cold” is by no means to be commended. In the later stages, however, a more liberal diet than at first, and in some cases even a moderate allowance of stimulants, affords considerable relief from the feeling of depression that remains for a time on the subsidence of a catarrh. The tendency to this disease, when habitual, and when not dependent on any form of constitutional disorder requiring special means for its cure, is best met by the daily use of the cold bath, with frequent exercise in the open air, and proper ventilation of the sleeping-apartment; also by friction of the skin, and by clothing, which, without being oppressive, is comfortably warm. Exposure to draughts or sudden chills, when the surface is perspiring, is to be avoided; but a close confined air habitually breathed in a workshop or bedroom, is a fruitful predisposing cause of the disease.

**CATASAU'QUA**, a borough in Lehigh co., Pa., on Lehigh river, 3 m. n. of Allentown; pop. '90, 3704. The Lehigh Valley and the New Jersey Central railroads unite here. It has water-works, electric lights, blast furnaces, machine-shops, silk mills; and a high school, national bank, and weekly newspapers.

**CATASTROPHEISM**, the doctrine that vast geological changes, with the correspondent changes in living forms, were sometimes due to catastrophes, such as the upheaval of mountains, the sudden disturbance of seas, strata, etc.: opposed to Uniformitarianism. The advocates of *C.* claim that the changes which have taken place in types are not sufficiently explained by evolution and natural selection, as taught by Huxley, Darwin, and many others; and that the importance of environment as a factor in these changes has been overlooked. The “moments of great catastrophes become moments of creation,” and out of plastic organisms the new forms are born.

**CATAW'BA**, a name of wines, both still and sparkling, produced in various parts of the United States. They are made from a grape called the Catawba grape, “first found growing wild near Washington, D. C., by Major Adlum.” This wine, which is scarcely known in England, is now in extensive use in North America, where it is gradually superseding the importation of the Rhenish and French sparkling wines, to which, in general character, it bears a resemblance. See **AMERICAN WINES**.

**CATAW'BA**, a co. in w. North Carolina, on the Catawba river, on the Chester and Lenoir and the Southern railroads; 388 sq. m.; pop. '90, 18,689. Co. seat, Newton.

**CATAW'BA**, or **GREAT CATAW'BA**, a river rising in the Blue Ridge, in n.w. North Carolina, and flowing e. and s. through the gold region of that state into South Carolina, where it takes the name of the Wateree and joins the Congaree, the two forming the Santee. The *C.* is about 250 m. long.

**CATAW'BAS**, Indians of North Carolina, once a large tribe in the region of Catawba river, but now a mere remnant. At the time of the early white settlements, they could muster many thousands of warriors, and as late as the revolution were able to furnish a valuable contingent to the Carolina troops. They occupied several towns

along the river that still bears their name; but at last leased the lands to the whites, and removed into the territory of the Cherokees, with whom they had been at war. After a short residence they returned to a reservation in their original district. Their language is closely allied to that of the Waccos and the Carolina tribe. Peter Harris, a revolutionary soldier, was said to be the last full-blooded survivor of the Catawba tribe.

**CATBALOGAN**, or CADVALONGA, a t. of the Philippines, capital of the island of Samar, on a small bay on the w. coast. The houses are mostly constructed of nipa palm, but there are some of stone. Pop. about 7,000.

**CAT-BIRD**, *Turdus felioz*, an American thrush, of the same group with the mocking-bird, which it resembles in its vocal powers. It is a bird of passage, making its way northward in spring through Georgia and Carolina as far as Massachusetts. It feeds on fruit and berries of all kinds, worms, and insects; builds a large nest of dry twigs, weeds, etc., without any attempt at concealment, in a bush or tree, often in the immediate vicinity of human habitations, and shows extraordinary boldness in the defense of its young. It has its name from a mewling cry which it utters when annoyed by an intruder approaching too near its nest.

**CAT-BOAT**, a small sailboat, usually not more than thirty feet in length, rigged with a large fore-and-aft mainsail only, set on a boom and gaff, and having the mast stepped as far forward as possible. Such a rig as this is called a *cat-rig*.

**CATCH**, a species of musical composition peculiar to England, and in the canon style. The words of the C. are generally humorous, and intended to be sung in social parties over a glass. The music is generally for three voices, of which there exist hundreds of specimens from the time of Purcell to the present day. As in the canon, each voice takes up the subject at a certain distance after the first has begun. One of the best specimens of a C. is by Calcott, on Hawkins's and Burney's histories of music, where the humor lies in one of the parts repeating "Burney's history"—sounding like "burn his history"—while the others are advocating Hawkins. See **ROUND**.

**CATCH-DRAINS**, open drains, and sometimes covered drains, along a declivity to intercept and carry off surface water.

**CATCHFLY**, the common English name of several plants of the natural order *caryophyllacea*—as *silene armeria*, *S. Anglica*, *lychnis viscaria*, etc.—which being clammy, in consequence of a peculiar exudation, on the calyx, on the joints of the stem, etc., often prove fatal to insects settling upon them. See **LYCHNIS** and **SILENE**.—The name is sometimes employed by botanists as a sort of popular equivalent to *silene*.—*Dionæa muscipula* is also sometimes called the Carolina catechism. See **DIONÆA**.

**CATCHPOLL**, a sheriff's officer, or bailiff, is so called in England, probably because he was in use to catch his victim by the *poll*, or head.

**CATEAU**, LE, or CATEAU-CAMBRESIS, a t. of France, in the department of Nord, situated on the Selle, 14 m. e.s.e. of Cambrai. C. has manufactures of shawls, merinoes, calicoes, and leather; it has also breweries and distilleries. Pop. '86, 9686.

**CATETHETICAL SCHOOLS**, the name given to the ancient Christian schools of theology, of which the chief were those of Antioch and Alexandria. Clement and Origen were the most famous of the teachers.

**CATECHISM**, from a Greek word, *katêcheō*, which means to resound, or sound into one's ears; hence to instruct by mouth. Persons undergoing instruction in the principles of Christianity were hence called *catechumens* (*katêchoumenoi*), and the teacher appointed for this purpose was called a *catechist*. Hence any system of teaching by question and answer is called a catechism.

Catechisms have long formed one of the principal means employed for popular instruction in the truths and duties of the Christian religion. The composition of the first catechisms was, in all probability, suggested by the ordinary oral instruction of catechumens, and was intended for the help both of teachers and pupils. It appears to have been in the 8th and 9th centuries that the first regular catechisms were compiled, of which that by Kero, a monk of St. Gall, and that ascribed to Otfried of Weissenburg, are among the most noted. At later periods, the use of catechisms prevailed chiefly among the opponents of the hierarchy, as among the Waldenses, the Albigenses, the Wickliffites, and, above all, among the Bohemian brethren. The term C. appears to have been first employed in its present sense among the latter. At an early period in the history of the reformation, the reformers began to avail themselves of this method of popular instruction, and their catechisms became important instruments in that great religious movement. In 1520, Luther published his first short catechism. In 1525, Justus Jonas and John Agricola were intrusted with the preparation of a catechism. In 1529, Luther published his larger and smaller catechisms, which found a place among the symbolical books or standards of the Lutheran churches. A number of catechisms were published also by the Swiss reformers, and by those of England and other countries. The Geneva catechisms, larger and smaller, were the work of Calvin. They were published in 1536, were speedily translated into various languages, and became acknowledged standards of the reformed churches, not only in Switzerland but in the low countries, in France, and

in Hungary. The church of Geneva has set aside the authority of these catechisms.—The Zurich C. is received as a standard in the church of Zurich.—The Heidelberg or palatinate C. is of greater importance, however, than any other as a standard of the Swiss reformed churches. It was compiled by the Heidelberg theologians, Caspar Olevian and Zacharias Ursinus, at the request of the elector Frederic III. of the palatinate; it was published in 1563, was approved by several synods, and was subjected to a revision by the synod of Dort.—In the church of Rome, the Romish or Tridentine C. is of high authority. It was prepared in accordance with the decrees of the council of Trent, by archbishop Leon. Marino, bishop Ægidius Foscorari, and the Portuguese dominican, Francis Fureiro; revised by cardinals Borromeo, Sirlet, and Antonian, and sanctioned by pope Pius V. It was published at Rome in 1566.—The C. of the Orthodox Greek church was prepared by Peter Mogilas, metropolitan in Kiew, and published in 1642. It received authority as a standard or symbolical book from a synod at Jerusalem in 1672. It is often called the larger Russian C., to distinguish it from the smaller C. prepared by order of Peter the Great.—Besides these catechisms, which have a historic interest, or are of importance from their symbolical character, there have appeared at all periods, since the reformation, many others, both Protestant and Roman Catholic, some doctrinal, some controversial, some devoted to particular subjects, as the sacraments, or to particular purposes, as the preparation of candidates for admission to the Lord's supper, some adapted to the mental capacity of very young children, etc. The opinion, however, has become prevalent, that doctrinal abstracts are not the best form in which religion can be presented to the young, and the use of catechisms has accordingly been in some measure relinquished in favor of other methods of instruction.

The C. of the church of England, with which we are most familiar, is the smaller one published in the book of Common Prayer. It is in two parts: the first contains and explains the baptismal covenant, the creed, the ten commandments, and the Lord's prayer; the second explains the two sacraments, baptism, and the Lord's supper. It is not known with absolute certainty who was the author of the first part; probably Cranmer and Ridley had the principal hand in framing the questions and answers. It was originally put forth with the 43 articles in the reign of Edward VI., and condemned as heretical in the reign of Mary. It must not be confounded with Cranmer's C., which was a larger work, differently arranged, and translated chiefly from the German C. used in Nuremberg. This first part of the church C. is spoken of as the *shorter* catechism.

There was a *larger* church C. compiled also in the reign of Edward VI., by Ponet, as is supposed, and it corresponds in some degree with the smaller work above described. It was afterwards revised and enlarged by Noel, dean of St. Paul's, and published in 1570; and though never officially promulgated by the church, it has some authority from having been approved by the lower house of convocation. At the Hampton court conference, in the reign of James I., the *shorter* C. was considered too short, and the larger one of Noel's too long; and accordingly, at the king's suggestion, an addition was made to the former of that explanation of the two sacraments which now forms the second part of the church catechism. This was drawn up by Dr. Overall. The whole is a work much esteemed by all sections of the church, as remarkable for its simplicity, truth, and catholicity. It, however, states the baptismal theory in a way that is not very acceptable to the extreme low church party. The rubrics in the Common Prayer book enjoin the teaching of the C. in the church on Sundays and holidays after the 2d lesson at evening prayer; and the 59th canon contains a like injunction, imposing penalties on the clergy who neglect this. The custom of catechizing in the church had fallen into almost universal disuse, but in many parishes it has been revived with excellent results.

The larger and shorter catechisms, which, with the Westminster confession of faith, constitute the standards or symbolical books of the Presbyterian churches throughout the British empire and the United States of America, were compiled by the assembly of divines at Westminster: the shorter C. "to be a directory for catechizing such as are of weaker capacity;" the larger, "for catechizing such as have made some proficiency in the knowledge of the Christian religion." The shorter C. was presented to the English house of commons on 5th Nov., 1647; the larger on the 14th April, 1648; and in July, 1648, both received the sanction of the general assembly of the church of Scotland—the general assembly, in the act approving of the larger C., declaring it to be "a rich treasure for increasing knowledge among the people of God," and that "they bless the Lord that so excellent a catechism has been prepared." The shorter C. has, however, been far more generally used for the purpose of instruction than the larger, which has been generally felt to be too minute in its statements, and too burdensome to the memory to be employed as a catechism. Even the shorter C. is regarded by many, who substantially adhere to its doctrine, as carrying the statement of dogmatic theology beyond what is proper for elementary instruction, whilst it has been long felt to be unsuitable for the very young and the very ignorant, and its use is now almost always preceded by that of catechisms more adapted to their capacity. Its influence, however, has been very great in forming the religious opinions, and in exercising and training the intellectual faculties, wherever Presbyterianism has prevailed: for it has been, and still



is, in almost universal use among Presbyterians speaking the English language, and to a considerable extent among Independents or Congregationalists both in Britain and America. In Holland also, a translation of it has been much used. It is very generally regarded, by those whose doctrinal views are in accordance with it, as an admirable compend of Christian doctrine and duty.—The authorship of the Westminster assembly's catechisms has been the subject of much debate, or at least the authorship of the first drafts of them; it being admitted that they were prepared with great care by committees of the assembly. But the probability appears to be, that their authorship is to be ascribed entirely to these committees; and that, like the Westminster confession of faith, they are thus the result of the joint labors of many. From discoveries made by the late Dr. M'Crie, it seems probable that at least the plan or scheme of the shorter C. is to be ascribed to Mr. Palmer.

**CATECHU**, a substance employed both as a coloring matter and medicinally as an astringent. The C. of commerce is obtained chiefly from East Indian trees, such as the C. tree (*acacia catechu*), betel-nut, etc.; but the greater part of that which is exported from India is made from the C. tree. It is known in India by the name *kutt*; and C. is said to be a name compounded of two words signifying *the juice of a tree* (*cate*, a tree, and *chu*, juice). Cutch is another form of one or other of these names, and is a common commercial name. The heart-wood alone of the tree yields C., which is obtained by cutting it into small chips, and boiling it in water, straining the liquid from time to time, and adding fresh supplies of chips, till the extract is of sufficient consistence to be poured into clay molds, which are usually of a square shape; or when of the thickness of tar, it is allowed to harden for two days, so that it will not run, and is formed into balls about the size of oranges, which are placed on husks of rice or on leaves, and appear in commerce enveloped in them. The C. manufacturers in Northern India move to different parts of the country at different seasons, and erect temporary huts in the jungles, where they carry on their operations. The C. tree abounds chiefly in the Bombay and Bengal presidencies; it is a small, erect, thorny tree, with a roundish head of (generally) prickly branches. Its sapwood is yellow, the heart-wood dark red. C. is brittle, and can readily be broken into fragments; is soluble in water, and possesses an astringent taste, but no odor. It is a very permanent color, and is employed in the dyeing of blacks, browns, fawns, drabs, and greens. It contains much tannin, and an acid called catechuic acid, which can be isolated in white silky crystals. It is often adulterated with earthy substances, but its ready solubility in water and alcohol, should at once show the presence of such, by leaving them behind in an insoluble state.—The C. of the betel-nut is obtained by boiling first the nuts, and then the extract to a proper consistency. A first boiling of the nuts for some hours is said to yield a black kind of C., called *kassu*; and a second boiling, after the nuts are dried, a yellowish-brown kind, called *coury*, which is considered the best, and is sold for the highest price. The former appears in commerce under the name of colombo C. or Ceylon C. (or cutch) in the form of circular flat cakes, covered on one side with husks of rice. The latter does not seem to reach Europe.—Gambier may be regarded as a kind of catechu. Kino (q.v.) is sometimes confounded with catechu. *Terra Japonica*, or Japan earth, is an old name for C., not quite disused, which was given to it on the supposition of its being an earthy substance brought from Japan.

**CATECHUMENS** (Gr. persons undergoing a course of instruction; see **CATECHISM**), the appellation given, in the early Christian church, to those converted Jews and heathens who had not yet received baptism, but were undergoing a course of training and instruction preparatory to it. They had a place assigned them in the congregation, but were not permitted to be present at the dispensation of the Lord's supper. In the apostolic age, converts appear to have been at once admitted to the sacraments; but afterwards this ceased to be the case, and a period of probation was required. The C. were divided into different classes or grades, according to their proficiency—those of the lowest grade were not permitted to be present during the prayers of the congregation; and those only of the highest, and who had been declared fit to be baptized at the next administration of the ordinance, were permitted to witness the dispensation of the Lord's supper.—The term C. was afterwards employed to designate young members of the Christian church who were receiving instruction to prepare them for confirmation or for the Lord's supper, and it is still often used in this sense.

**CATEGORIES**. This designation has come down to us from Aristotle. One of the books of his *Organon* or Logical System is so named. The C., or predicaments, as the schoolmen called them, are to be understood as an attempt at a comprehensive classification of all that exists, for the purposes of logical affirmation, proof, or disproof. The entire universe may be classified in various ways—as into things celestial and terrestrial; into matter and spirit; into organized and unorganized; into minerals, plants, animals, etc. But the classification contemplated under the C. proceeds on the very general properties or attributes that most extensively pervade all existing things, although in unequal degrees. A good example is quantity, which pertains to every thing that we know or can think of. We give the Aristotelian enumeration—the first column is the

original Greek; the second, the Latin rendering of the schoolmen; the third, the nearest corresponding English words:

Οὐσία,	Substantia,	Substance.
Ποσόν,	Quantitas,	Quantity.
Ποιόν,	Qualitas,	Quality.
Πρός τι,	Relatio,	Relation.
Ποιείν,	Actio,	Action.
Πάσχειν,	Passio,	Passivity.
Πού,	Ubi,	Position in space.
Πότε,	Quando,	Position in time.
Κεῖσθαι,	Situs,	Situation.
ἔχειν,	Habitus,	Possession.

Mr. J. S. Mill has the following remarks on the above scheme: "The imperfections of this classification are too obvious to require, and its merits are not sufficient to reward, a minute examination. It is a mere catalogue of the distinctions rudely marked out by the language of familiar life, with little or no attempt to penetrate, by philosophical analysis, to the *rationale* even of these common distinctions. Such an analysis, however superficially conducted, would have shown the enumeration to be both redundant and defective. Some objects are admitted, and others repeated several times under different heads. It is like a division of animals into men, quadrupeds, horses, asses, and ponies. That, for instance, could not be a very comprehensive view of the nature of Relation, which could exclude action, passivity, and local situation from that category. The same observation applies to position in time and position in space; while the distinction between the latter and situation is merely verbal."—*Logic*, book i., chap. iii. § 1. Some writers have endeavored to save the C. from these objections, by declaring that the fourth, Relation, is to be looked upon as a general head, comprehending the remaining six under it. But there is no evidence that Aristotle had this view in his mind; on the contrary, it appears almost certain that his idea of Relation was too narrow and limited to admit of his giving it so great a comprehension.

Mr. Mill gives us the result of his own analysis, the following enumeration and classification of existences or describable things:

1. Feelings, or states of consciousness; which are the most comprehensive experience that the human mind can attain to, since even the external world is only known as conceived by our minds.

2. The minds which experience those feelings.

3. The bodies, or external objects, which are supposed to excite all that class of feelings that we denominate sensations.

4. The successions, and coexistences, the likenesses and unlikenesses, between feelings or states of consciousness. Although the relations are considered by us to subsist between the bodies, or things, external to our minds, we are driven in the last resort to consider them as really subsisting between the states of each one's own individual mind.

Mr. Mill shows that all possible propositions—and it is with the truth or falsehood of propositions that the science of logic has chiefly to do—affirm or deny one or other of the following properties or facts: Existence—the most general attribute of all—Co-existence, sequence or succession, causation—a peculiar case of succession—and resemblance. It is to arrive at this classification of propositions, for the purposes of logic, that the foregoing analysis, corresponding to the Aristotelian C., was made. The properties affirmed of any thing or things, or the things of which any properties are affirmed, come under some one or other of the four heads above given.

The C. of Kant, which are sometimes brought into comparison with those of Aristotle, are conceived under a totally different point of view. See sir W. Hamilton's *Discussions on Philosophy*, 2d edit., p. 26. They refer to certain forms supposed to be inherent in the understanding itself, under which the mind embraces the objects of actual experience. The Kantian philosophy supposes that human knowledge is partly made up of the sensations of outward things—color, sound, touch, etc.—and partly of intuitions existing in the mind prior to all experience of the actual world. This is the point of difference between the school of Locke—who rejected all innate ideas, conceptions, or forms—and the school of Kant. No such question was raised under the Aristotelian categories. Kant's enumeration of his innate forms is as follows: 1. Quantity, including unity, multitude, totality; 2. Quality, including reality, negation, limitation; 3. Relation, including substance and accident, cause and effect, action and reaction; 4. Modality, which includes possibility, existence, necessity. These indicate the elements of our knowledge *a priori*; it being the opinion of the author, that such notions, as causation, necessity, etc., cannot be obtained from the exercise of our senses and intelligence upon the world of realities, but must have been somehow or other imprinted upon the mind originally. See ANTI-NOMY: KANT.

CA' TEL, FRANZ, 1778–1856; a German artist who first gained reputation by his illustrations of Goethe's *Hermann and Dorothea*. He labored in Paris and Rome, and his works found their way all over the continent. He left all his fortune for the benefit of poor artists.

**CATENARY.** The C. is the curve formed by a flexible homogeneous cord hanging freely between two points of support, and acted on by no other force than gravity. If the cord is not homogeneous, and the density varies in any regular way, the cord hangs in a curve slightly different in shape from that of the ordinary catenary. The C. possesses several remarkable properties, one of which is, that its center of gravity (q.v.) is lower than that of any curve of equal perimeter, and with the same fixed points for its extremities. Where the cord is such that the weight of any part of it is proportioned to its horizontal projection, the curve is a parabola (q.v.). The latter curve and the ordinary C. are of importance chiefly in the theory of suspension bridges (q.v.).

**CATENIPORA**, a genus of fossil lamelliferous corals peculiar to paleozoic strata, confined in Britain to the Silurian measures. The genus is easily recognized. The cells are terminal and oval, arranged like a loose net-work of chains, hence called "chain coral." Vertical anastomosing lamellæ united the cells together, and formed a hemispherical polypidom, sometimes of great size. See illus., SILURIAN AND DEVONIAN FOSSILS, vol. XIII.

**CATERAN** OR **CATHERAN**. (Gaelic and Irish *ceatharnach*, a soldier), originally an Irish or Highland soldier; frequently, however, used of a robber or freebooter.

**CATERINA**, SANTA, a t. of Sicily, in the province of Caltanissetta, and 7 m. n.n.w. of the town of that name. It is situated on a hill near the river Salso. Pop. 7200.

**CATERPILLAR**, the name given to the larvæ of lepidopterous insects—butterflies, moths, and hawk-moths. Caterpillars exhibit as great differences as subists among the perfect insects into which they change, and the family, genus, and species may be determined by the characters of the C., as well as of the perfect insect. Their body is generally long, nearly cylindrical, soft, and consisting of 12 rings or segments besides the head, with nine spiracles or small openings for respiration on each side. The head is much harder than the rest of the body, of a sort of almost horny substance, and has 6 small shining points on each side, which are regarded as simple or *stigmatic* eyes, and is also furnished with two very short rudimentary antennæ. The mouth is adapted for tearing, cutting, and masticating the substances on which the C. is destined to feed, which are very various in the different species, although in all extremely different from the food of the perfect insect; it is provided with two strong *mandibles*, or upper jaws: two *maxilla*, or lower jaws; a *labium*, or lower lip; and four *palpi*, or feelers. In the mouth also is situated the *spinneret* of those species which, when they change into the chrysalis or pupa state, envelop themselves wholly in silken cocoons. See **SPINX**. The first three segments of the body are each furnished with a pair of feet, which are hard and scaly, and represent the 6 feet of the perfect insect; some of the remaining segments are also furnished with feet, varying in all from 4 to 10 in number, the last pair situated at the posterior extremity of the body; but these feet are soft and membranous or fleshy, and armed at their extremity with a sort of circlet of minute hooks. All the feet or legs are very short. Those caterpillars in which the *pro-legs*, as they are sometimes called, or supplementary soft feet, are pretty equally distributed along the body, move by a sort of regular crawling motion; but those which have only four such feet situated near the posterior extremity, move by alternately taking hold by what may be called their fore-feet and their hind-feet, now stretching the body out to its full length, and now bending it into an arch, whilst the hinder part is brought forward almost into contact with the forepart. Caterpillars which move in this way are called *geometers* or *loopers*. Some caterpillars have the power of fixing themselves by the two hind feet to a twig, and stretching themselves out as straight as a rod, so that being in color very like a twig of the tree on the leaves of which they feed, they are not readily observed. The muscular power required for this position of rest is very great, and Lyonnet found the number of muscles in a C. to be more than 4,000. The skin of some caterpillars is naked, that of others is covered with hairs, spines, or tubercles. Some make for themselves nests or tents of silk, under which they dwell in societies, protected from the inclemency of the weather. Many construct cases or sheaths by agglutinating various substances together, as the C. of the common clothes-moth. Some roll together leaves, and fix them by threads, so forming a dwelling for themselves; and a few burrow and excavate galleries in the substance of leaves. Many feed on leaves; many being limited to a particular kind of plant, or to a few nearly allied plants. Some feed on flowers, some on seeds, some on roots, and some even on the woody portions of stems; some on wool, hides, furs, and other animal substances; a few on lard, and other kinds of fat. Among the admirable arrangements which make all nature harmonious, is the adjustment of the time of each kind of C.'s appearance to that of the leaf or flower on which it is to feed. See illus., BUTTERFLIES, ETC., vol. III.

**CATERPILLAR FUNGUS**, or **FUNGOID PARASITES**, a species of fungus that attacks insects, particularly the larvæ of moths and beetles, filling their bodies and sending shoots beyond the skin so that the creature takes the appearance of a vegetable growth. These growths vary in length from a slight projection to nearly a foot, and in diameter from a hair to a quarter of an inch.

**CATESBY**, MARK, 1680-1749; an English naturalist who was seven years in the American colonies, returning to England in 1719 with a fine collection of plants. He

made another journey in 1722, exploring South Carolina, Georgia, Florida, and the Bahamas. He published *Natural History of Carolina, Florida, and the Bahama Islands*, in which the figures were etched by himself from his own paintings, etc.

**CAT-FISH**, a name given to several species of the family *Silurida*, dwelling in American rivers and lakes. The common cat-fish, or horned pout, of the Atlantic slope, is preferred above most river fish for food. They are from 7 to 9 in. long, dusky brown in color on the back and sides, and white underneath. The upper jaw is the longest; the tail is rounded; skin without scales and commonly covered with a slimy secretion. It has two fleshy barbels (long beard like spines) on the top of the nose, and others at the angles of the jaws. Its mouth is very large. Immense cat-fish are found in the great lakes and western rivers, more than 4 ft. long and weighing 60 to 150 lbs. See *illus.*, *FISHES*, vol. VI.

**CATGUT** is employed in the fabrication of the strings of violins, harps, guitars, and other musical instruments; as also in the cords used by clockmakers, in the bows of archers, and in whip-cord. It is generally prepared from the intestines of the sheep, rarely from those of the horse, ass, or mule, and *not* those of the cat. The first stage in the operation is the thorough cleansing of the intestines from adherent feculent and fatty matters; after which they are steeped in water for several days, so as to loosen the external membrane, which can then be removed by scraping with a blunt knife. The material which is thus scraped off is employed for the cords of battle-doors and rackets, and also as thread in sewing the ends of intestines together. The scraped intestines are then steeped in water, and scraped again, when the large intestines are cut and placed in tubs with salt, to preserve them for the sausage-maker; and the smaller intestines are steeped in water, thereafter treated with a dilute solution of alkali (4 oz. potash, 4 oz. carbonate of potash, and 8 to 4 gallons of water, with occasionally a little alum), and are lastly drawn through a perforated brass thimble, and assorted into their respective sizes. In order to destroy any adherent animal matter, which would lead to putrefaction and the consequent development of offensive odors, it is customary to subject the C. to the fumes of burning sulphur—sulphurous acid, which acts as an antiseptic (q.v.), and arrests decomposition. The best strings are used for musical instruments; and those which come from Italy, and are known as *Roman strings*, are the strongest. They are remarkable for their clearness and transparency. Cord for clockmakers is made, from the smallest of the intestines, and occasionally from larger ones, which have been split longitudinally into several lengths. Whip-cord is fabricated from C. which has been twisted in a manner somewhat similar to single-corded ropes. The C. obtained from the intestines of horses, asses, and mules is principally made in France, and is employed instead of leather-belts for driving machinery.

**CA'THA**, a genus of the natural order *celastraceæ*. The fruit is a three-cornered capsule.—*C. edulis*, sometimes called **ARABIAN TEA**, the **KHÂT** of the Arabians, is a shrub with erect smooth branches, elliptical obtusely serrated leaves, and small flowers in axillary cymes. It is a native of Arabia, and the Arabs ascribe to its leaves, even carried about the person, extraordinary virtues as a preventive of plague, with probably about as much reason as our forefathers had for esteeming the rowan tree formidable to witchæ. When fresh, they are stimulant, narcotic, and intoxicating, and are eaten with greediness by the Arabs. They are very antisoporific, so that a man, after using them, may keep watch for a whole night without drowsiness.

**CATHARI**, or **CATHARISTS** (Gr. pure), a name very generally given to various sects which appeared in the church during the middle ages. It appears to have been sometimes assumed in profession of a purity of doctrine and morals superior to that which generally prevailed in the church, sometimes bestowed ironically in ridicule of such a profession, and perhaps was first used as a designation of the Paulicians (q.v.). It became a common appellation of sects which appeared in Lombardy in the beginning of the 11th c., and afterwards in France and the w. of Germany. Having some connection with the Bulgarian Paulicians, they were sometimes called *Bulgarians*; sometimes also *Patarenes* or *Patarines*, sometimes *Publicans* or *Popelitanes*, and in the Low Countries, *Piphles*. The names *Albigenses* and C. are often used as equivalent to one another; but we are under the disadvantage of having to depend entirely on the writings of very bigoted adversaries for our knowledge of their doctrines and practices, and considerable obscurity rests on all this interesting part of ecclesiastical history. Manicheism, Gnosticism, and Montanism are ascribed to the C.; but there is much reason to think that the errors of a few were often indiscriminately charged upon all, and that such charges indeed sometimes rested on ignorant or willful misconception. It appears quite certain, that the C. differed considerably in their doctrines and in the degree of their opposition to the dominant church. Some of them advocated and practiced a rigid asceticism. There is no good evidence that any of them nearly approached to the doctrines of the reformation; although in their rejection of tradition, of the authority of Rome, of the worship of saints and images, etc., there are notable points of agreement with the views of the reformers.

**CATHARINE** is the name of six saints of the Roman Catholic church. The simple designation of *Saint C.*, however, is given to a virgin, said to have been of royal descent

in Alexandria, who, publicly confessing the gospel at a sacrificial feast appointed by the emperor Maximinus, was put to death in 307 A.D., after being tortured on a wheel. Hence the name of "St. Catharine's wheel." Very extraordinary legends exist as to her converting 50 philosophers sent by the emperor to convert her in prison, besides a multitude of other persons; the conveyance of her head by the angels to Mt. Sinai, etc. She is regarded as the patroness of girls' schools.—*Saint C. of Siena*, one of the most famous saints of Italy, was the daughter of a dyer in Siena, and was born there in 1347 A.D.; practiced extraordinary mortifications; and was said to be favored with extraordinary tokens of favor by Christ, whose wounds were impressed upon her body, etc. She became a Dominican, and, therefore, afterwards a patron saint of the Dominicans. She wrote devotional pieces, letters, and poems, which have been more than once printed: the best edition appeared at Siena and Lucca, in 1707-18, in 4 vols. 4to, under the title of *Opere della servifica Santa Catarina*.—*St. C. of Bologna* and *St. C. of Sweden* are of less note.

**CATHARINE I.** Empress of Russia, was originally by name Martha Rabe, and was the posthumous daughter of John Rabe, a Swedish quarter-master in Livonia. Her mother died in 1685, when she was but three years old. Left hopeless and destitute, a parish-clerk took compassion on her, and supported her, and a Lutheran clergyman in Marienburg, afterwards received her into his house as an attendant on his children. In 1701, she married a Swedish dragoon, who next year was called to active service; and Marienburg being taken by the Russians, she became for some time the mistress of gen. Bauer; and afterwards entering the service of the princess Menschikoff, she attracted the notice of Peter the Great. In 1703, she went over to the Greek church, and took the name of Catharina Alexiowna. After being for some years the emperor's mistress, she was privately married to him in 1711; the marriage was publicly avowed in 1712; she was proclaimed empress in 1718, and was crowned at Moscow in 1724. She bore eight children to the emperor, all of whom died in childhood, except two daughters, Anne and Elizabeth, the latter of whom was afterwards empress of Russia, and the former married the duke of Holstein, and was the mother of the emperor Peter III. When Peter the Great and his army seemed entirely in the power of the Turkish army on the Pruth in 1717, C., who was with him, sought an interview with the grand vizier, and, by employing her jewels to bribe his attendants, succeeded in procuring the deliverance of the Russians. Her conduct on this occasion excited so much admiration and gratitude in the emperor, that he resolved to appoint her his successor. Yet in the end of the year 1724, she became the object of his displeasure and suspicion, on account of an alleged intimacy with a chamberlain, whom he caused to be beheaded. Menschikoff, who had always been attached to her interests, was at this time in disgrace. But she had contrived in a great measure to recover her position, when, on 28th Jan., 1725, Peter the Great died. His death was kept secret as long as possible, that everything might be arranged for her taking possession of the throne; and the archbishop of Pleskow came forward and declared before the troops and people, that the emperor, on his death-bed, had declared her alone worthy to be his successor. The hostility and hesitation of the nobles were at once overcome, and C. was acknowledged as empress and sole ruler of all the Russias. Under Menschikoff's directions, the affairs of government went on well enough for a time; but the empress ere long began to yield to the influence of a number of favorites, addicted herself to drunkenness, and lived such a life as could not fail to hurry her to the grave. She died, however, unexpectedly, 17th May, 1727.

**CATHARINE II.** empress of Russia, was b. at Stettin on 25th April, 1729. Her father, the prince of Anhalt-Zerbst, was a Prussian field-marshal, and governor of Stettin. She received the name of Sophia Augusta; but the empress Elizabeth of Russia having selected her for the wife of her nephew and intended successor, Peter, she passed from the Lutheran to the Greek church, and took the name of Catharina Alexiowna. In 1745, her marriage took place. She soon quarreled with her husband, and each of them lived a life of unrestrained vice. Among his attendants was a count Soltikow, with whom her intimacy soon became scandalous; and Soltikow was sent on an embassy abroad. But the young Polish count, Stanislaus Poniatowski, almost immediately supplied his place. After the death of the empress Elizabeth in 1761, Peter III. ascended the Russian throne; but the conjugal difference became continually wider. C. was banished to a separate abode; and the emperor seemed to entertain the design of divorcing her, declaring her only son, Paul, illegitimate, and marrying his mistress, Elizabeth Woronzow. The popular dislike to Peter, however, rapidly increased; and at length, he being dethroned by a conspiracy, C. was made empress. A few days afterwards Peter was murdered (July, 1762). What participation his wife had in his murder, has never been well ascertained.

C. now exerted herself to please the people, and among other things, made a great show of regard for the outward forms of the Greek church, although her principles were, in reality, those of the infidelity then prevalent among the French philosophers. The government of the country was carried on with great energy; and her reign was remarkable for the rapid increase of the extent and power of Russia. Not long after her accession to the throne, her influence secured the election of her former favorite, Stanislaus Poniatowski, to the throne of Poland. In her own empire, however, discontentment

was seriously manifested, the hopes of the disaffected being centered in the young prince Ivan, who was forthwith murdered in the castle of Schlisselburg. From that time, the internal politics of Russia long consisted in great part of intrigues for the humiliation of one favorite and the exaltation of another. The first partition of Poland in 1772, and the Turkish war, which terminated in the peace of Kainardji in 1774, vastly increased the empire. The Turkish war which terminated in the peace of Jassy in 1792, had similar results, and also the war with Sweden, which terminated in 1790. The second and third partitions of Poland, and the incorporation of Courland with Russia, completed the triumphs of C.'s reign. She began a war with Persia, however, and cherished a scheme for the overthrow of the British power in India; but a stroke of apoplexy cut her off on Nov. 9, 1796. She was a woman of great ability; but, utterly devoid of principle, she shrunk from no crime; and sensuality and ambition governed all her actions. She was shameless in vice; and always had a paramour, who dwelt in her palace, and might be regarded as filling an acknowledged office of state, with large revenues and determinate privileges. Yet distinguished authors flattered her; and she invited to her court some of the literati and philosophers of France. She was ever ready to commence great undertakings, but most of them were left unfinished; and little was really accomplished in her reign for the improvement of the country, or the progress of civilization. On a visit to the southern provinces of the empire in 1787, she was gratified by a perpetual display of fictitious wealth and prosperity along the whole route. This imperial progress was also a triumphal procession of her vile favorite Potemkin (q. v.).

**CATHARINE DE' MEDICI**, the queen of Henri II. of France, was the daughter of Lorenzo de' Medici, duke of Urbino, and was b. at Florence in 1519. In her 14th year she was brought to France, and married to Henri, the second son of Francis I. The marriage was a part of the political schemes of her uncle, pope Clement VII., but as he died soon after, she found herself friendless and neglected at the French court. In these circumstances, she conducted herself with a submission which seemed even to indicate a want of proper spirit, but which gained her the favor of the old king, and in some measure also of her husband. It was not till the accession of her eldest son, Francis II., in 1559, that her love of power began to display itself. The Guises at this time possessed a power which seemed dangerous to that of the throne, and C. entered into a secret alliance with the Huguenots to oppose them. On the death of Francis II. in 1560, and accession of Charles IX., the government fell entirely into her hands. Caring little for religion in itself, although she was very prone to superstition, she disliked the Protestants, chiefly because their principles were opposed to the absolute despotism which she desired to maintain. Yet she sought to rally the Protestant leaders around the throne, in order to remove the Guises. This attempt having failed, and the civil war which ensued having ended in the peace of Amboise, highly favorable to the Protestants, she became alarmed at the increase of their power, and entered into a secret treaty with Spain for the extirpation of heretics; and subsequently into a plot with the Guises, in which at first only the murder of the Protestant leaders was contemplated, but which resulted in the fearful massacre of St. Bartholomew's day. This event brought the whole power of the state into the hands of the queen-mother, who boasted of the deed to Roman Catholic governments, and excused it to Protestant ones, for she now managed all the correspondence of the court. About this time she succeeded, by gold and intrigues, in getting her third son, afterwards Henri III., elected to the Polish throne. But her arbitrary and tyrannical administration roused the opposition of a Roman Catholic party, at the head of whom was her own fourth son, the duke of Alençon, who allied themselves with the Protestants. It was very generally believed that she was privy to the machinations that led to his death. When, after the death of Charles IX., Henri III. returned from Poland to be king of France, his mother still ruled the court, and had the principal share in all the intrigues, treacheries, and political transactions of that woful period. Having betrayed all who trusted them, she and her son found themselves at last forsaken and abhorred by all. The league and the Guises had no more confidence in them, than had the Protestants and Henri of Navarre. Vexation on this account preyed on the proud heart of the queen-mother in her last days; and, amidst the confusion and strife of parties, she died at Blois, on 5th Jan., 1589, unheeded and unlamented. Her ruling passion was ambition, and to this she was ready to sacrifice everything. Her unprincipled policy had almost subverted the French monarchy; her extravagance and luxury exhausted the finances of the country. Her influence was powerful in increasing the demoralization of the court and of society. She unscrupulously employed beauties of her train to corrupt men whose power she feared.

**CATHARINE OF ARAGON**, Queen of England, the first wife of Henry VIII., and fourth daughter of Ferdinand and Isabella, king and queen of Castile and Aragon, was b. Dec., 1485. She occupies a prominent place in English history, not for what she herself was, but for what she was the occasion of—the reformation. Married when scarcely 16, to Arthur, prince of Wales, son of Henry VII., she was left a widow within a year; and in the course of a few months more a second marriage was projected for her by her father-in-law, with his second son Henry, as yet a boy of only 12 years old. The pope's dispensation enabling such near relatives to marry was

obtained in 1508, and the marriage took place in June, 1509, immediately after Henry's accession to the crown as Henry VIII. Although Henry was very far from being a model husband, he appears to have treated queen C., who had borne him several children, with all due respect, until about 1527, when he conceived a passion for Anne Boleyn (q. v.). He now expressed doubts as to the legality of his marriage, and set about obtaining a divorce. Pope Clement VII. would readily have annulled the marriage permitted by his predecessor, had he not feared queen C.'s powerful nephew, the emperor Charles V. He, however, granted a commission to Campeggio and Wolsey, to inquire into the validity of the marriage; but before these prelates queen C. refused to plead, and appealed to the pope. The king craved judgment. The legates cited the queen, and declaring her contumacious when she appeared not, went on with the cause; but the wily Campeggio, anxious only for time for his master when the king expected an answer, prorogued the court until a future day. The king consulted the universities of Europe, many of which declared the marriage invalid. The pope now summoned the king to Rome, but Henry haughtily refused to appear either himself, or by deputy, which he maintained would be to sacrifice the prerogatives of his crown; and setting the pope at defiance, married Anne Boleyn. Cranmer, shortly afterwards (1533), declared the first marriage void, and pope Clement annulled Cranmer's sentence, making the separation from Rome complete. Queen C. did not quit the kingdom, but took up her residence first at Ampthill, in Bedfordshire, and afterwards at Kimbolton castle, Huntingdonshire, where she led an austere religious life until her decease in Jan., 1536. Queen C.'s personal character was unimpeachable, and her disposition sweet and gentle.

**CATHARINE PARR**, the sixth wife of Henry VIII., was the daughter of sir Thomas Parr, and was b. in 1512. Married first to lord Burgh, and afterwards to lord Latimer, she, in July 12, 1543, became queen of England by marriage with Henry VIII. She was distinguished for her learning and her knowledge of religious subjects, her discussion of which with the king had well-nigh brought her to the block, like so many of her predecessors. Her tact, however, saved her, and brought rebuke on her enemies; for she made it appear to the king's vanity, that she had only engaged him in discourse about the reformation, in order to derive profit from his majesty's speech. She persuaded Henry to restore the right of succession to his daughters, and interested herself on behalf of the universities. After Henry's death, she married, 1547, sir Thomas Seymour, and died the following year, not without suspicion of poison.

**CATHARINE'S, ST., COLLEGE**, or **HALL**, Cambridge, was founded by Robert Wode-larke, provost of King's college, 1473, for a master and three or more fellows. The visitors sent down to the university by Edward VI. ordered that there should be then six fellows, and in future a greater or less number as the revenues permitted. The statutes confirmed in May, 1860, provide that there shall be a master and nine fellows.

**CATHARTES AURA**, a vulture known as the turkey-buzzard, from its resemblance to the domestic turkey. Its home is in the southern Atlantic and gulf states, though it is sometimes found in the West Indies. The full-grown bird is 30 in. long, with a spread of wings of 6 ft., and the color black and brown. This greedy bird acts as the scavenger for southern cities, devouring refuse matter that might otherwise be injurious to the public health. For this purpose they are deemed so valuable that in some places their destruction is forbidden. There is a small species known locally as the carrion-crow.

**CATHARTIC ACID**, a very unstable colloid glucoside, black and uncrystallizable, which appears to be the active purgative principle of senna (q. v.).

**CATHARTICS** (Gr. *kathairō*, I purify), a name originally for all medicines supposed to purify the system from the matter of disease (*materies morbi*), which was generally presumed by the ancients to exist in all cases of fever and acute disease (see *CRISIS*), and to require to be separated or thrown off by the different excretions of the body. Ultimately, the term C. became limited in its signification to remedies acting on the bowels, which are popularly called *purgatives*—a mere translation of the Greek word. The principal C. are aloes, gamboge, colocynth, rhubarb, scammony, jalap, senna, Epsom, and other salts, and castor oil. Sulphur and cream of tartar forms a well-known mild laxative; magnesia is also useful in many cases of indigestion with acidity. Croton oil and elaterium belong to a more dangerous class of C., as also does the favorite remedy of the ancients—the black hellebore. The doses and use of the more ordinary remedies of this class are explained in all works on medicine. See **CONSTIPATION**.

**CATHARTINE**, or **BITTER OF SENNA**, is the essential principle in senna which possesses laxative or purgative properties. It can be isolated as a yellowish-red uncrystallizable solid, which is deliquescent, soluble in water and alcohol, insoluble in ether, has a very bitter nauseous taste, a characteristic odor, and possesses great purging powers, accompanied by nausea and griping. Three grains of C. are a full dose.

**CATHAY**. See **CHINA**.

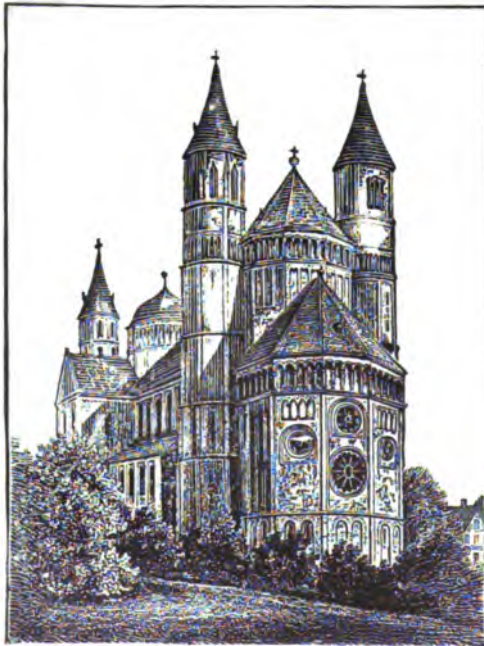
**CATHCART**, Sir **GEORGE**, son of William, Earl Cathcart, was b. in London, 1794. Educated at Eton and Edinburgh, he, in 1810, joined the 2d life guards, and fought with the grand army in the campaigns of 1812 and 1813; and as aid-de-camp to the duke of Wellington, was present at Quatre Bras and Waterloo. In 1828, he was made lieut.







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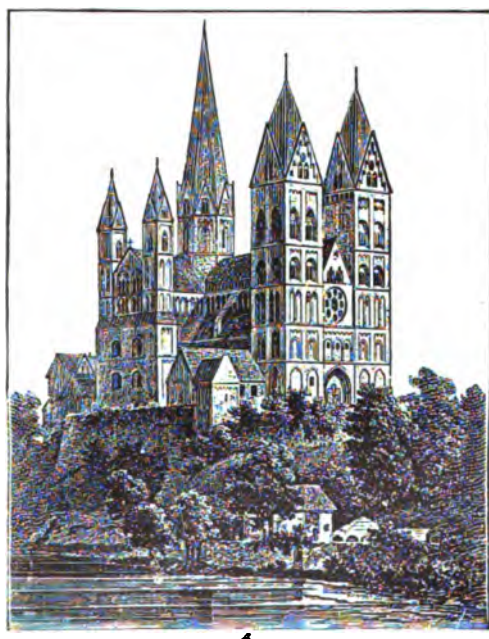
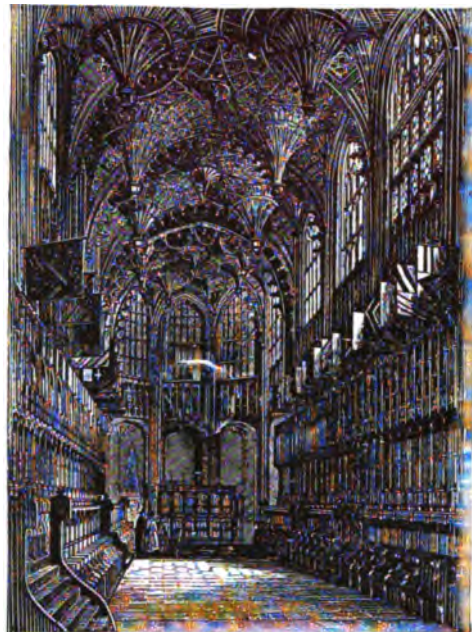
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**CATHEDRALS.**—1. Cathedral at Worms. 2. Interior of cathedral at Lichfield. 3. Interior of Westminster Abbey.





3. Interior of cathedral at Prague. 4. Cathedral at Limburg on the Lahn. 5. Chapel of Henry VII.,



col., and served in British America and the West Indies for about 8 years; and in 1837 he proved himself an energetic and efficient officer in quelling the outbreak in Canada, where he remained for more than 6 years. In 1852, having held the appointment of deputy lieutenant of the tower for some years, he was made governor of the Cape of Good Hope, with command of the forces, and in this capacity succeeded in bringing to a successful end the harassing Kafir war. He returned to England in time to be sent out to the Crimea as general of division. His bravery here was conspicuous, especially in the battle of Inkermann, where the odds were so terribly against the British forces, and where he was slain, Nov. 5, 1854. He was buried where he fell, and the place was named Cathcart's Hill after him. C. was the author of a very valuable work, entitled *Commentaries on the War in Russia and Germany in 1812 and 1813* (Lond. 1850).

**CATHCART, WILLIAM SHAW**, Earl, a British gen. and diplomatist, son of baron Cathcart of Cathcart, co. of Renfrew, was b. Sept. 17, 1755. Having studied at Glasgow, he entered the army, took a prominent part in the American war, and fought with distinction inlanders and n. Germany. In 1801, he was made lieutenant-gen., and in 1803, commander-in-chief for Ireland. In 1805, he was engaged on a diplomatic mission to the czar Alexander. In July, 1807, he received the command of the land forces employed to co-operate with the fleet in the attack on Copenhagen, and, for his services in this capacity, was made a British peer, with the title of viscount, and received a vote of thanks from both houses of parliament, Jan. 28, 1808. In 1812, he was sent as ambassador to St. Petersburg, accompanied the czar Alexander in the campaigns of 1813 and 1814, and was present at the congresses of Chatillon and Vienna. He was raised to the rank of earl, June 18, 1814. The latter years of his life were chiefly spent at his country residence, Cartside, near Glasgow, where he died June 17, 1848.

**CATHRAD.** See CAT (on shipboard).

**CATHEDRAL**, from a Greek word *cathedra*, signifying a *seat*. Thus, "to speak *ex cathedra*," is to speak as from a *seat* of authority. The C. city is the seat of the bishop of the diocese, and his throne is placed in the C. church, which is the parish church of the whole diocese. The diocese was, in fact, anciently called *parochia*, until the application of this name to the smaller portions into which it was derived. A C. town has generally been understood to be entitled to the honors of a city, even although the town be not a borough incorporate; but in the case of Manchester, the claim was disallowed by a court of law. The distinction between C. and collegiate churches consists principally in the see of the bishop being at the former. The governing body of a C. is called the dean and chapter—i.e., the dean and canons who meet for corporate purposes in the chapter-house of the cathedral. The property of the C. vests in this body. They elect the bishop of the diocese on the issue of a *congé d'élire* from the crown, but as the person to be elected is always named, and they may be compelled by a mandamus to elect that person and no other, the election is merely a form.

The bishop is "visitor" of the dean and chapter. In England, by the act of 1840, all members of cathedrals, except the dean, are styled canons. Their *seat* in the C. is called their *stall*. They are no longer called prebends. Canons must reside 8 months in each year. The act allows to the canons of Durham, Manchester, St. Paul's, and Westminster, an income of £1000 per annum; to those of every other C. in England, £500. The bishop was always considered of common right to have the patronage of canonries, but formerly there were exceptions. Now, the appointment to all canonries is vested either in the bishop, or in the crown. Where the bishop is patron, he "colates," and the dean and chapter "induct," by placing the new canon in a stall in the church. The crown appoints by letters-patent, and the canon is installed without collation. Honorary canons have no emoluments, but rank after the canons. Minor canons, of whom there are from 2 to 6 in each C., perform the daily choral services. The C. service is the usual church of England service intoned, with an anthem and the Psalms chanted. For the general plan of C. buildings, see CHURCH. The more remarkable cathedrals will be noticed under the names of the towns in which they are situated. In England and Wales the number of cathedrals is 84—the most famous for architectural beauty being those at Salisbury, Canterbury, Lincoln, Ely, Peterborough and York. An interesting series of papers on the English cathedrals from the pen of Mrs. Schuyler Van Rensselaer will be found in the *Century Magazine* for 1888-9.

*History of Cathedrals.*—As Christianity was first established chiefly in cities, the churches that grew up adjacent to them were, either originally or eventually, included in the diocese of the city bishop. Throughout the Roman empire the ecclesiastical divisions were the same as the civil, and the bishop's seat was placed in the same city with the governor's chair of state. From this point the transition was easy to the formal decree requiring that a C. as the seat of a bishop should be established in cities only. In Britain, however, where in the early days of Christianity cities were few and small, this rule could not be enforced. The bishop was over a district or tribe rather than a city, and naturally placed his seat where he found it most convenient and safe. Often he was compelled to remove it from one place to another. As the country became more settled this necessity ceased to exist, and at the close of the 11th century a law was passed requiring that the sees of bishops should be removed from villages to walled cities. In the early missionary work, especially of Britain, instead of beginning with a bishop,

companies of priests were organized, with the church as their center of work and the monastery as their home. After sufficient progress had been made, a bishop was appointed over them, and the church became a cathedral. The revival of missionary work by the church of England, at the beginning of the present century, led to a renewal of this system. The bishop followed the missionaries, and placed his seat in a church not originally designed for the honor. In colonial and foreign missionary work, within the last 25 years, there has been a return to the earlier plan. In the dioceses of Africa, New Zealand, and elsewhere, the bishop takes the lead in the date of his appointment as well as in rank, and his cathedral church is at once erected and manned. In this way the original design of such an establishment as described by bishop Stillingfleet is accomplished. "Every C., in its first institution, was as a temple to the whole diocese, where the worship was to be performed in the most decent and constant manner; for which end it was necessary to have such a number of ecclesiastical persons there attending as might still be ready to do all the offices which did belong to the Christian church—such as constant offering of prayer, singing, preaching, and administering sacraments—which were to be kept up in such a church as the daily sacrifice was in the temple." The bishop in his church was surrounded by his college of presbyters, of which he was the head, and the design of which was: 1. To strengthen him by wise counsel. 2. To maintain public worship with reverence and dignity. 3. To go forth at his command, as evangelists, whithersoever he might send them. In this way the chapter of the C. was established, originally in closest connection with the bishop, and having no corporate existence separate from him. It sometimes consisted of "secular clergy," who were not bound by monastic vows, and had separate homes of their own; and sometimes of "regulars," who were under monastic rule and lived in buildings common to all. Of both kinds of chapters the bishop was the head: of the latter, as the abbot of the monastery to which his cathedral church belonged; and of the former, as having sole authority over it. In early times, there was an arch-presbyter, who had chief authority among the cathedral clergy, always in strict subordination to the bishop. He was gradually supplanted by the archdeacon, who was followed in the 8th and 9th centuries by the "prepositus" or provost. The "dean," the present head of all English cathedral chapters, first appears in the 10th or 11th century. Gradually, as the bishop's diocesan duties increased and important political functions also were assigned him, he was obliged to leave the affairs of his C. to the head of the chapter, who consequently, in time, became the actual chief; and when the chapter was organized as an independent corporation, the bishop, seldom present, sank into a mere "visitor," called in occasionally to correct abuses or settle disputes. This is the explanation of the strange anomaly, witnessed in modern times, that in his own cathedral church, of which he is the titular head, and which is dignified by the presence of his seat, the bishop has less authority than in any other church of his diocese. Under the bishop as its *nominal* head, the chapter of a fully organized C., formed of secular priests, consisted of four chief dignitaries and a body of canons. I. The four high officers were: 1, the "dean," as the general head of the chapter charged with its internal discipline; 2, the precentor, presiding over the choir and musical arrangements; 3, the chancellor, who superintended the religious and literary instruction of the younger members, took care of the library, and wrote the letters; 4, the treasurer, to whom were intrusted, not the money of the church (as might appear from the modern use of the word), but its sacred vessels, altar-furniture, reliquaries, and similar treasures. II. In addition to these dignitaries, a cathedral chapter consisted of a board of officers called canons, because they were inrolled on the *list* and perhaps because they were subjected to the *rules*; some of them who enjoyed a separate estate (*præbenda*) in addition to their share of the corporate funds, were called prebendaries. A prebendary was always a canon, but a canon was not always a prebendary. Each canon had his own house and personal establishment. In the middle ages an attempt was made to impose on them, in part, monastic rules with dining-hall and lodging-rooms in common; but the restriction was never acceptable, and was gradually given up. Monastic cathedrals closely resembled other monasteries, except that in the almost constant absence of the bishop—their nominal abbot—they were governed by a prior. At the reformation the distinction between secular and monastic cathedrals was maintained under the titles of cathedrals of the old and new foundations.

In 1888, the following dioceses of the Protestant Episcopal church in the United States had cathedrals: Albany, Arkansas, Central Pennsylvania, Chicago, Colorado, Easton, Fond du Lac, Georgia, Iowa, Kansas, Long Island, Maine, Minnesota, Nebraska, Northern Texas, Quincy, Tennessee, Utah, Western Texas, Wisconsin; and funds are now being raised towards the erection of noble C. buildings in New York city for the diocese of New York. The finest specimen of cathedral architecture at present existing in this country is found in St. Patrick's Roman Catholic cathedral, in New York city, begun in 1858 and practically completed in 1889, at a cost of some \$2,500,000.

The most imposing and magnificent Gothic cathedral in the world is that at Cologne, begun in 1248. Other noble structures are the Duomo in Florence, the Cathedral at Milan, Strasburg cathedral, Notre Dame at Paris, and the Ulm cathedral, the last having the highest spire in the world; completed in 1890. The cathedral church of the Pope is not, as is generally supposed, St. Peter's, but the church of St. John Lateran.

**CATHELINÉAU, JACQUES**, general of the army in La Vendée, in the w. of France, was b. Jan. 5, 1759, in very humble life, at Pin-en-Mauges, in lower Anjou. Horrified at the atrocities and despotic acts of the convention, he placed himself in opposition to

It, and soon collected around him a body of loyal peasantry, whom he led against and defeated the republicans in several conflicts. After the victory of Saumur (q.v.), the council of generals appointed him, as having the greatest influence over his countrymen, commander-in-chief. He immediately determined to make an attack upon Nantes, and managed to penetrate into the town, where he was wounded by a musket-ball, and his troops immediately dispersed. He was carried to St. Florent, where he died July 11, 1793. He was a man of great simplicity and honesty of character, and his piety was such, that he was called the saint of Anjou.

**CATHERINE OF BRAGANZA**, 1638-1705; queen of Charles II. of England, daughter of John, duke of Braganza, the rightful heir to the throne of Portugal, then under Spanish rule. John headed the revolt of 1640, and after years of fighting succeeded in reaching his throne. The mother of Catherine was a woman of ability, and governed Portugal for several years after the death of her husband. She foresaw the coming restoration in England, and proposed the marriage of Catherine with Charles mainly to gain a powerful ally against Spain. The latter power vainly tried to prevent the marriage, and when it was agreed upon, Portugal promised a dowry of £500,000, and the towns of Tangier and Bombay (the latter being the first of the now enormous English possessions in the east), besides many privileges of trade. On the marriage at Plymouth, May 18, 1663, Charles appeared to be well pleased with his bride; but the union proved unhappy. Catherine had been brought up in a convent, and had none of the manners required by the most fashionable and profligate court of Europe. The chief trouble, however, was the heartless and shameless profligacy of her husband, who brought his mistresses into the court, and, when the queen expressed her indignation at the insult, lectured her upon the duty of submission. After repeated humiliations of this kind, the queen's spirit was broken, and alienation naturally followed. As she was a Roman Catholic, she was an object of suspicion outside of the court, and her name was subjected to calumny. The only satisfaction she could experience in her unfortunate connection was the great aid rendered by England against Spain in the struggle of her native power with that kingdom. After a life of entire seclusion during the reign of James II. and the first years of William III., she returned to Portugal in 1692, where, for a time before her death, she acted in capacity of regent to her brother, Don Pedro. She had no children.

**CATHERINE FIESCHI ADORNO**, SAINT, 1447-1510; a daughter of the viceroy of Naples, who, at the age of 18, devoted herself to a religious life, but three years later, in obedience to parental desire, married Julian Adorno, a gay young nobleman of Genoa—a reckless fellow, who spent her fortune and gave her a life of misery for many years. After his death she became mother-superior in the hospital, and extended her care to the sick throughout the city. She wrote several works, two of which, *Purgatory*, and *Dialogues Between the Soul and the Body*, are evidently records of her own experience. She was canonized in 1737. In her, a piety contemplative, mystical, and almost ecstatic, had an accompaniment not always found of active beneficence.

**CATHERINE OF VALOIS**, or OF FRANCE, 1401-37; Queen of Henry V. of England. She was unfortunate in her childhood, her father, Charles VI. of France, being subject to prolonged fits of insanity, while her mother—who was one of the most abandoned women of the time—neglected her children to such an extent that they were often without suitable food or clothing. She was at last taken away from her mother and educated in a convent. When she was only 12 years old, Henry asked her hand in marriage, coupling the proposal with a demand for a large dowry in money, and the restitution to England of the French provinces once held by the English crown. The proposition was indignantly rejected, and Henry soon afterwards invaded France and asserted his claims in a manner that was not to be resisted. All his claims were admitted, and when he married Catherine at Troyes in 1420 he received immediate possession of the provinces claimed, the regency of France during the life of the father-in-law, and the reversion of the sovereignty after the death of Charles. In 1421, Catherine was crowned at London, and in Dec. of that year she became the mother of Henry VI. The next year she was in France, where her husband died, and she returned to London with the funeral cortège; but after the funeral little is heard of her history, the only notable event being her secret marriage to Owen Tudor, the heir of a princely house in Wales, who had distinguished himself for bravery at Agincourt. His position in England, however, was low, and the marriage was long kept secret—a necessity that caused Catherine much vexation and probably hastened her death. Her son by Tudor was made earl of Richmond, and married Margaret Beaufort, heiress of the house of Somerset, and junior representative of the branch of John of Gaunt, and she became the mother of Henry VII., and consequently the ancestress of the Tudor line of English kings.

**CATHERINE-WHEEL** is a device which is frequently used as a charge in coats of arms, when it is represented with teeth. See also PYROTECHNY.

**CATHETER** (Gr. *kathēmi*, to thrust into) was a name applied indifferently to all instruments used for passing along mucous canals. In modern times, however, it has generally been reserved for tubular rods through which fluids or air may pass, and which may give free exit to the accumulated contents of such organs as the urinary bladder. The



C. for the latter purpose is a very old surgical instrument. The ancients made theirs of copper, which accumulated verdigris. In the 9th c. silver was substituted by the Arabian surgeons as a cleaner metal, and is still used by all who are not obliged, for economical reasons, to have their catheters made of German silver or pewter. The urinary C. for the male varies in length from 10 to 11 in.; the female C. need not be more than 4 or 5 inches. The form is a matter of indifference, but most surgeons prefer an instrument straight to within the last few inches of its length; the latter should be curved into the segment of a small circle. Others, however, use a double curve, and, indeed, nearly every surgeon has a peculiar fancy in this respect.

Flexible catheters are made of gum elastic, which may be used either alone or supported on a wire. Many other materials have been proposed. Of late years, vulcanized rubber has been very generally employed.

**CATHODE.** See ANODE; ELECTRO-CHEMISTRY.

**CATHODE RAYS.** See PHOTOGRAPHY; ROENTGEN.

**CATHOLIC AND APOSTOLIC CHURCH**, the title of a body of Christians generally but improperly known as Irvingites (q. v.).

**CATHOLIC CHURCH.** The term catholic literally signifies *universal*. The phrase C. C. is therefore equivalent to "universal church," and cannot properly be applied to any particular sect or body, such as the Roman, Anglican, Genevan, Reformed Lutheran, or Presbyterian, all of which form merely portions more or less pure of the "church universal." It was first employed to distinguish the Christian church from the Jewish; the latter being restricted to a single nation, whereas the former was intended for the world in general. Afterwards, it served to mark the difference between the orthodox Christian church and the various sects which sprang from it, such as the Cerinthians, Basilidians, Arians, Macedonians, etc. The name has been retained by the church of Rome, which was the visible successor of the primitive one; and although Protestant divines have been careful to deny its applicability to a church which they consider buried under the corrupt accretions of centuries, yet the term catholic is still used by the populace of almost every Protestant country as synonymous with Roman Catholic, so that from their minds all conception of the literal meaning of the word has vanished. For an account of the church of Rome, see art. ROMAN CATHOLIC CHURCH.

**CATHOLIC, or UNITED COPTS**, a body of about 10,000 native Egyptians who acknowledge the authority of the pope of Rome. In 1855, one of their priests was appointed vicar apostolic and bishop *in partibus*.

**CATHOLIC CREDITOR**, in the law of Scotland, is one whose debt is secured over several or the whole subjects belonging to the debtor—e.g., over two or more heritable estates for the same debt. The C. C. is bound so to exercise his right as not unnecessarily to injure the securities of the other creditors. Thus, if he draw his whole debt from one of the subjects, he must assign his security over the others to the postponed creditors.

**CATHOLIC (ROMAN) EMANCIPATION ACT** (10 Geo. IV. c. 7). To render this famous measure intelligible, and still more to convey a conception of its importance to younger readers, it is necessary that we should preface our account of it by a slight sketch of the position of Roman Catholics in Great Britain, before it was passed. From first to last, the sufferings of the Roman Catholics were the fruit of political tyranny quite as much as of religious rancour or fanaticism, and their release was effected by a change in the political rather than in the religious views or feelings of the dominant party. The first occasion on which even a promise of a different line of policy from that which had been originally adopted was held out to the Roman Catholics of Ireland, was on the termination of the revolutionary war in 1691; and had king William been able to carry out the views which his personal enlightenment and liberality dictated, it is probable that Catholic emancipation would have been hastened by more than a century. But the English parliament, which was intensely anti-Roman Catholic, enacted, on the 22d of Oct. 1691, that Irish members of both houses should take the oaths of supremacy; and three years later, a set of acts were passed, which placed the Roman Catholics in a worse position than at any previous period of their history. The whole population was disarmed, and the priests banished from the country. But what must have been still more intolerable, was the interference with the private arrangements of their families. All Roman Catholics were prohibited from acting as guardians not only to Protestant but to Catholic children. At a somewhat later date (1704), it was enacted that if a son chose to turn Protestant, he should be entitled to dispossess his father, and at once to take possession of the family estate. Though Catholics were not directly declared incapable of holding land, they were deprived of the right of acquiring it by purchase, or even by long lease; and if a Catholic chanced to occupy a place in a line of entail, he was passed over in favor of the next Protestant heir. No office of trust, civil or military, was now open to a Catholic; he was forbidden to vote at elections, to intermarry with a Protestant, or even to dwell in Limerick or Galway, except under certain conditions. But perhaps the most demoralizing provision of all, was that which empowered the son of a Catholic to bring his father into chancery, to force him to declare on oath the value of his property, and to settle such an allowance on him as the court should determine, not only for the father's life, but the son's.

Amongst the other burdens of this heavy time, may be mentioned the exclusion of Catholics from the profession of the law, and the regulation that if a Protestant lawyer married a Catholic, he should be held to have gone over to her faith: the prohibition against Catholics acting as schoolmasters, under the penalty of being prosecuted as convicts, by which the whole body was virtually excluded from the benefits of education: and the still more summary enactment, that if a priest celebrated marriage between a Protestant and a Catholic, he should be hanged. But as years passed away, the memory of the foul deeds of the inquisition and the confessional, and of the other enormities of which Roman Catholics had been guilty in their days of power, waxed fainter; milder feelings began to prevail; and when Grattan appeared as the champion of their rights, the field was already in some degree prepared for his labors. Favored by such influences, of which no one knew better how to avail himself, he succeeded, in 1780, in carrying, in the Irish parliament, the famous resolution, "that the king's most excellent majesty, and the lords and commons of Ireland, are the only competent power to make laws to bind Ireland." Many of the disqualifying statutes were now repealed, and the claim for complete equality with Englishmen and Protestants, or complete separation from the sister-country, was now formally urged. From this period to the final liberation was achieved, there was no rest. The Irish rebellion of 1798 brought home to the English nation the dangers to which it would constantly be exposed till the question was finally adjusted. The act of union of 1800 was the immediate consequence of that outbreak; and to this act the Irish were induced to consent by a virtual pledge entered into by Mr. Pitt, to the effect that the Catholic disabilities should be at once removed. But, like William of Orange, Pitt had pledged himself to more than he was able to accomplish. The king was seized with scruples regarding the obligations imposed upon him by his coronation oath, and made a vigorous stand against the proposals of his minister.

At a subsequent period, efforts were made in the direction of emancipation by Mr. Canning and Lord Castlereagh. About 1824, the press began to take up the question warmly; a Catholic association was formed, to prepare petitions to parliament; the Irish priests stimulated their flocks to subscribe for the purposes of agitation; O'Connell rapidly became a power; and as early as March, 1825, the importance of the question was so deeply felt, that sir F. Burdett ventured to introduce a relief bill, which passed the commons by a majority of 268 to 241, but was rejected by the lords. A slight temporary reaction now took place, the superstitious fears of ignorant Protestants being excited by a "no-papery" cry, and in consequence, a new relief bill, introduced in 1827, though supported by the last effort of Canning's eloquence, was lost in the commons by a majority of 4. But the liberal view of the Roman Catholic claims was essentially the popular one—at least among the enlightened classes; and as a proof of this, under the hostile administration of the duke of Wellington, the very same resolution which had lost in 1827 by a minority of 4, was carried in 1828 by a majority of 6. The duke himself now began to waver in opinion, so that the beginning of the end was manifestly near. During O'Connell's famous canvass for the county of Clare, the duke declared in the house of lords, "if the public mind were now suffered to be tranquil, if the agitators of Ireland would only leave the public mind at rest, the people would become more satisfied, and I certainly think it would then be possible to do something." O'Connell's return for Clare, notwithstanding the existence of the oaths which precluded him from taking his seat in the house, and the events which now followed in quick succession, made it clear that the "something" of which the duke had spoken must be the passing of the emancipation bill in the ensuing session. The king's speech, which was read on the 5th Feb. of the following year, accordingly contained a recommendation to parliament, to consider whether the civil disabilities of the Catholics could not be removed, "consistently with the full and permanent security of our establishments in church and state."

On the 5th Mar., Mr. Peel brought forward the great measure. The majority on the motion in the commons for going into committee was 188, in a house of 508 members the debate on the second reading issued in a majority of 180; and the final majority, after the bill had passed through committee, in which not one of the many amendments proposed was carried, was 178 in a house of 462. In the lords, the debate lasted three nights, the majority being 106 in favor of the second reading of a bill which, nine months before, the same house had refused, by a majority of 45, even to entertain—so rapid and threatening had been the progress of the agitation. On the 13th April, 1829, this famous measure became the law of the land. It now only remains that, by mentioning the provisions of the act, we sum up the results of one of the most important controversies that ever agitated the inhabitants of this country. For the oath of supremacy, another oath was substituted, by which all Catholic members of parliament bound themselves to support the existing institutions of the state, and not to injure those of the church. Catholics were admitted by the same act to all corporate offices, and to an equal enjoyment of all municipal rights. The army and navy had already been opened to them. On the other hand, they were excluded from the offices of regent, of chancellor of England or Ireland, and of viceroy of Ireland; from all offices connected with the church, its universities and schools, and from all disposal of church patronage. The most important security related to the franchise, in which a £10 was substituted for a 40s. qualification in Ireland. The clergy of the R. C. church were left



in the position of other dissenters, the government having declined either to endow them, or to introduce any machinery for prying into their relations to the pope. But the public use of their insignia of office, and of episcopal titles and names, was denied them; the extension of monachism was prohibited.

**CATHOLIC EPISTLES**, the name given, according to Clemens Alexandrinus and Origen, to certain epistles, addressed not to particular churches or individuals, but either to the church universal or to a large and indefinite circle of readers. Originally, the C. E. comprised only the first epistle of John and the first of Peter, but, at least as early as the 4th c. (as evinced by the testimony of Eusebius), the term was applied to all the apostolic writings used as "lessons" in the orthodox Christian churches. But this included the epistle of James, of Jude, the 2d of Peter, and the 2d and 3d of John. These seven thus constituted the C. E., although the genuineness and authenticity of the last-mentioned five were not universally acknowledged; but this very incorporation with epistles whose canonicity was not questioned, naturally had the effect of confirming their authority, so that in a short time the entire seven came to be considered a portion of the canon.

**CATHOLIC MAJESTY**, *HIS MOST.* One of the formal designations of the King of Spain.

**CATHOLICS**, OLD. See OLD CATHOLICS.

**CATHOLICOI**, the title of the patriarchs or chief ecclesiastics in the hierarchy of the Armenian church, and of the Christians of Georgia and Mingrelia.

**CATHOLICI, ROMAN.** See ROMAN CATHOLIC CHURCH.

**CATILINA**, LUCIUS SERGIUS, descended from a patrician but impoverished family, was b. about the year 108 B.C. During his youth, he attached himself to the party of Sulla. His bodily constitution, which was capable of enduring any amount of labor, fatigue, and hardship, allied to a mind which could stoop to every baseness and feared no crime, fitted him to take the lead in the conspiracy which has made his name infamous to all ages. In the year 68 B.C., he was elected prætor; in 67 B.C., governor of Africa; and in 66 B.C., he desired to stand for the consulship, but was disqualified on account of the accusations brought against him of maladministration in his province. Disappointed thus in his ambition, and burdened with many and heavy debts, he saw no hope for himself but in the chances of a political revolution, and therefore entered into a conspiracy, including many other young Roman nobles, in morals and circumstances greatly like himself. The plot, however, was revealed to Cicero by Fulvia, mistress of one of the conspirators. Operations were to commence with the assassination of Cicero in the Campus Martius, but the latter was kept aware of every step of the conspiracy, and contrived to frustrate the whole design. In the night of Nov. 6 (63 B.C.), Catiline assembled his confederates, and explained to them a new plan for assassinating Cicero; for bringing up the Tuscan army (which he had seduced from its allegiance), under Manlius, from the encampment at Fesulae; for setting fire to Rome, and putting to death the hostile senators and citizens. In the course of a few hours, everything was made known to Cicero. Accordingly, when the chosen assassins came to the house of the consul, on pretense of a visit, they were immediately repulsed. On the 8th of Nov., Catiline audaciously appeared in the senate, when Cicero—who had received intelligence that the insurrection had already broken out in Etruria—commenced the celebrated invective beginning: *Quousque tandem abutere, Catilina, patientia nostra?* etc. ("How long now, Catiline, will you abuse our patience?") The scoundrel was abashed, not by the keenness of Cicero's attack, but by the minute knowledge he displayed of the conspiracy. His attempt at a reply was miserable, and was drowned in cries of execration. With curses on his lips, he abruptly left the senate, and escaped from Rome during the night. Catiline and Manlius were now denounced as traitors, and an army under the consul, Antonius, was sent against them. The conspirators who remained in Rome, the chief of whom was Lentulus, were arrested, tried, condemned, and executed, Dec. 5. The insurrections in several parts of Italy were meanwhile suppressed; many who had resorted to Catiline's camp in Etruria, deserted when they heard what had taken place in Rome, and his intention to proceed into Gaul was frustrated. In the beginning of Jan. (62), he returned by Pistoria (now Pistoia) into Etruria, where he encountered the forces under Antonius, and, after a desperate battle, in which he displayed almost superhuman courage and enthusiasm, was defeated and slain. The appearance of Catiline was in harmony with his character. He had a daring and reckless look; his face was haggard with a sense of crime; his eyes were wild and bloodshot, and his step unsteady, from nightly debauchery. The history of the Catiline conspiracy is given by Sallust in a remarkably concise and nervous style.

**CATI-NEAU-LAROCHE**, PIERRE MARIE SÉBASTIEN, 1772-1828; a French philologist who emigrated to San Domingo, where his antislavery sentiments were so obnoxious that he was prosecuted and saved from death only by the interference of the home government. He went to Cape Haytien, where in the great massacre he alone of 17 Frenchmen was saved. He returned to Paris by way of the United States, set up a printing-office, and produced several dictionaries. In 1819, he was sent by the government to study the climate of French Guiana.

**CAT ISLAND.** See **BAHAMAS**.

**CATKIN**, *Amentum*, in botany, a spike of numerous, small, unisexual flowers, destitute of calyx and corolla, and furnished with scale-like bractæ instead, the whole inflorescence finally falling off by an articulation in a single piece. Examples are found in the willow, hazel, oak, birch, alder, and other trees and shrubs, forming the natural order amentaceæ (q.v.). In some, as in the oak and hazel, the male flowers only are in catkins.

**CATLIN**, GEORGE, 1796-1873; b. Penn.; an artist celebrated for his travels, writings, and portraits of American Indians. He was bred to the law and practiced for a year or two in Philadelphia, but having a taste for art he established himself in New York as a portrait-painter. About 1832, he became impressed with the fact, that the most remarkable American Indians were fast disappearing, and resolved to rescue at least the portraits of some of them from oblivion. In pursuit of this object he traveled and dwelt among the aboriginal tribes in North and South America, acquiring their languages, and thoroughly studying their manners and customs, traditions, history, and modes of life. After collecting many portraits, and many sketches of life and scenery, he published in London, in 1841, a large work on the *Manners, Customs, and Condition of the North American Indians*, with 800 illustrations. In 1844, followed the *North American Portfolio of Hunting Scenes*; in 1848, *Eight Years' Travels and Residence in Europe*, in which he gives the stories of several Indians whom he had introduced to various European courts. In 1864, he published a little monograph which created much interest among medical men, entitled *The Breath of Life*, in which he argued the importance of keeping one's mouth closed when sleeping—an idea doubtless suggested by the fact that the Indians use special care in this respect. His last work was *Last Rambles among the Indians of the Rocky Mountains and the Andes*.

**KATMANDOO**, **KATMANDU**, or **KHATMANDU**. See **NEPAUL**.

**CATMINT**, *Nepeta cataria*, a plant of the natural order *labiate*, pretty common in England, in chalky and gravelly soils, but rare in Scotland and Ireland, widely diffused throughout Europe and the middle latitudes of Asia, and of North America; remarkable for the fondness which cats display for it. It appears to act upon them in a similar way to valerian root; and when its leaves are bruised so as to be highly odoriferous, they are at once attracted to it, rub themselves on it, tear at it, and chew it. Its odor has been described as intermediate between that of mint and that of pennyroyal. It has erect stems, 2 to 8 ft. high, dense whorls of many whitish flowers, tinged and spotted with rose-color, and stalked heart-shaped leaves of a velvety softness, whitish and downy beneath.—Other species are numerous in the s. of Europe, and middle latitudes of Asia.

**CATNIP**. See **CATMINT**.

**CATO**, **DIONYSIUS**, is the name prefixed to a little volume of moral precepts in verse, which was a great favorite during the middle ages. Whether or not such a person ever existed, is a point of the greatest uncertainty. The title which the book itself commonly bears, is *Dionysii Catonis Disticha de Moribus ad Piliūm*. Its contents have been differently estimated: some scholars have considered the precepts admirable; others, weak and vapid: some have found indications of a superior scriptural knowledge; others, of a deep-rooted paganism. The style has been pronounced the purest Latin and the most corrupt jargon. The truth would seem to be, that on a ground-work of excellent Latin of the silver age, the illiterate monks of a later period have, as it were, inwoven a multitude of their own barbaric errors, which preclude us from determining precisely the period when the volume was composed. It begins with a preface addressed by the supposed author to his son, after which come 56 injunctions of rather a simple character, such as *parentem ama*. This is followed by the substance and main portion of the book—viz., 144 moral precepts, each of which is expressed in two dactylic hexameters. During the middle ages, the *Disticha* was used as a text-book for young scholars. In the 15th c., more than 80 editions were printed. The best edition, however, is that published at Amsterdam in 1754 by Otto Arntzenius. Caton translated it into English.

**CATO**, **MARCUS PORCIUS**, surnamed *Censorius* and *Sapiens* ("the wise"), afterwards known as **CATO PRISCUS** or **CATO MAJOR**—to distinguish him from Cato of Utica—was b. at Tusculum in 284 B.C. He inherited from his plebeian father a small farm in the country of the Sabines, where he busied himself in agricultural operations, and learned to love the simple and severe manners of his Roman forefathers, which still lingered round his rural home. Induced by Lucius Valerius Flaccus to remove to Rome when that city was in a transition epoch, from the old-fashioned strictness and severe frugality of social habits, to the luxury and licentiousness of Grecian manners, C. appeared to protest against this, to denounce the degeneracy of the Philo-hellenic party, and to set a pattern of sterner and purer character. He soon distinguished himself as a pleader at the bar of justice, and after passing through minor offices, was elected consul. In his province of Nearer Spain, where an insurrection had broken out after the departure of the elder Scipio (206 B.C.), C. was so successful in quelling disturbances and restoring order, that in the following year he was honored by a triumph. C. exhibited extraordinary military genius in Spain; his stratagems were brilliant, his plans of battle were

marked by great skill, and his general movements were rapid, bold, and unexpected. In 187 B.C., a fine opportunity occurred for the display of "antique Roman" notions. M. Fulvius Nobilior had just returned from Ætolia victorious, and sought the honor of a triumph. C. objected. Fulvius was indulgent to his soldiers, a man of literary taste, etc., and C. charges him, among other enormities, with "keeping poets in his camp." These rude prejudices of C. were not acceptable to the senate, and C.'s opposition was fruitless. In 184 B.C., C. was elected censor, and discharged so rigorously the duties of his office, that the epithet *Censorius*, formerly applied to all persons in the same station, was made his permanent surname. Many of his acts were highly commendable. He repaired the water-courses, paved the reservoirs, cleansed the drains, raised the rents paid by the publicans for the farming of the taxes, and diminished the contract prices paid by the state to the undertakers of public works. More questionable reforms were those in regard to the price of slaves, dress, furniture, equipage, etc. His despotism in enforcing his *own* idea of decency may be illustrated from the fact, that he degraded Manilius, a man of pretorian rank, for having kissed his wife in his daughter's presence in open day. C. was a thoroughly dogmatic moralist, intolerant, stoical, but *great*, because he manfully contended with rapidly swelling evils; yet not *wise*, because he opposed the bad and the good in the innovations of his age with equal animosity.

In the year 175 B.C., C. was sent to Carthage to negotiate on the differences between the Carthaginians and the Numidian king Masinissa; but having been offended by the Carthaginians, he returned to Rome, where, ever afterwards, he described Carthage as the most formidable rival of the empire, and concluded all his addresses in the senate-house—whatever the immediate subject might be—with the well-known words: "*Ceterum censeo, Carthaginem esse delendam*" ("For the rest, I vote that Carthage must be destroyed").

Though C. was acquainted with the Greek language and its literature, his severe principles led him to denounce the latter as injurious to national morals. He died 149 B.C., at the age of 85. C. was twice married. In his eightieth year, his second wife, Salonia, bore him a son, the grandfather of Cato of Utica. C. treated his slaves with shocking harshness and cruelty. In his old age, he became greedy of gain, yet never once allowed his avarice to interfere with his honesty as a state-functionary. He also composed various literary works, such as *De Re Rustica* (a treatise on agriculture)—much corrupted, however. The best editions are by Gesner and Schneider in their *Scriptores Rei Rusticæ*. His greatest historical work, *Origines*, has, unfortunately, perished; but some few fragments are given in Krause's *Historicorum, Romanorum Fragmenta* (Berlin, 1838). Fragments of C.'s orations—of which as many as 150 were read by Cicero—are given in Meyer's *Oratorum Romanorum Fragmenta* (Zurich, 1842).

CA'TO, MARCUS PORCIUS, named CATO THE YOUNGER, or CATO UTICENSIS (from the place of his death), was born 95 B.C. Having lost, during childhood, both parents, he was educated in the house of his uncle, M. Livius Drusus, and, even in his boyhood, gave proofs of his decision and strength of character. In the year 72 B.C., he served with distinction in the campaign against Spartacus, but without finding satisfaction in military life, though he proved himself a good soldier. From Macedonia, where he was military tribune in 67, he went to Pergamus in search of the Stoic philosopher, Athenodorus, whom he brought back to his camp, and whom he induced to proceed with him to Rome, where he spent the time partly in philosophical studies, and partly in forensic discussions. Desirous of honestly qualifying himself for the quæstorship, he commenced to study all the financial questions connected with it. Immediately after his election, he introduced, in spite of violent opposition from those interested, a rigorous reform into the treasury offices. He quitted the quæstorship at the appointed time amid general applause. In 63 B.C., he was elected tribune, and also delivered his famous speech on the Catiline conspiracy, in which he denounced Cæsar as an accomplice of that political desperado, and determined the sentence of the senate. Strongly dreading the influence of unbridled greatness, and not discerning that an imperial genius—like that of Cæsar—was the only thing that could remedy the evils of that overgrown monster, the Roman republic, he commenced a career of what seems to us blind pragmatism in opposition to the three most powerful men in Rome—Crassus, Pompey, and Cæsar. C. was a noble but strait-laced *theorist*, who lacked the intuition into circumstances which belongs to men like Cæsar and Cromwell. His first opposition to Pompey was successful; but his opposition to Cæsar's consulate for the year 59 not only failed, but even served to hasten the formation of the first triumvirate between Cæsar, Pompey, and Crassus. He was afterwards forced to side with Pompey, who had retired from his connection with Cæsar, and become reconciled to the aristocracy. After the battle of Pharsalia (48 B.C.), C. intended to join Pompey, but hearing the news of his death, escaped into Africa, where he was elected commander by the partisans for Pompey, but resigned the post in favor of Metellus Scipio, and undertook the defense of Utica. Here, when he had tidings of Cæsar's decisive victory over Scipio at Thapsus (April 6, 46 B.C.), C., finding that his troops were wholly intimidated, advised the Roman senators and knights to escape from Utica, and make terms with the victor, but prohibited all intercessions in his own favor. He resolved to die rather than surrender, and, after spending the night in reading Plato's *Phædo*, committed suicide by stabbing himself in the breast.

**CAT'ODON** and **CATODON'TIDÆ**. See **CACHOLOT**.

**CAT-O'-NINE-TAILS**. See **FLOGGING**.

**CATOO'BA**, a co. in n.w. Georgia, watered by affluents of the Tennessee river, and crossed by the Western and Atlantic railroad; 149 sq.m.; pop. '90, 5481, incl. colored. The region is hilly, with much woodland. The productions are chiefly agricultural. Co. seat, Ringgold.

**CATOPTRICS**. The divisions of the science of optics are laid out and explained in the article **OPTICS** (q.v.). C. is that subdivision of geometrical optics which treats of the phenomena of light incident upon the surfaces of bodies, and reflected therefrom. All bodies reflect more or less light, even those through which it is most readily transmissible; light falling on such media, for instance, at a certain angle, is totally reflected. Rough surfaces scatter or disperse (see **DISPERSION OF LIGHT**) a large portion of what falls on them, through which it is that their peculiarities of figure, color, etc., are seen by eyes in a variety of positions; they are not said to *reflect* light, but there is no doubt they do, though in such a way, owing to their inequalities, as never to present the phenomena of reflection. The surfaces with which C., accordingly, deals, are the smooth and polished. It tracks the course of *rays* and *pencils* of light after reflection from such surfaces, and determines the positions, and traces the forms, of images of objects as seen in mirrors of different kinds.

A ray of light is the smallest conceivable portion of a stream of light, and is represented by the line of its path, which is always a straight line. A pencil of light is an assemblage of rays constituting either a cylindrical or conical stream. A stream of light is called a converging pencil when the rays converge to the vertex of the cone, called a focus; and a diverging pencil, when they diverge from the vertex. The axis of the cone in each case is called the axis of the pencil. When the stream consists of parallel rays, the pencil is called cylindrical, and the axis of the cylinder is the axis of the pencil. In nature, all pencils of light are primarily diverging—every point of a luminous body throwing off light in a conical stream; converging rays, however, are continually produced in optical instruments, and when light diverges from a very distant body, such as a fixed star, the rays from it falling on any small body, such as a reflector in a telescope, may, without error, be regarded as forming a cylindrical pencil. When a ray falls upon any surface, the angle which it makes with the normal to the surface at the point of incidence is called *the angle of incidence*; and that which the reflected ray makes with the normal, is called *the angle of reflection*.

Two facts of observation form the ground-work of catoptrics. They are expressed in what are called the laws of reflection of light: 1. In the reflection of light, the incident ray, the normal to the surface at the point of incidence, and the reflected ray, lie all in one plane. 2. The angle of reflection is equal to the angle of incidence. These laws are simple facts of observation and experiment, and they are easily verified experimentally. Rays of all colors and qualities follow these laws, so that white light, after reflection, remains undecomposed. The laws, too, hold, whatever be the nature, geometrically, of the surface. If the surface be a plane, the normal is the perpendicular to the plane at the point of incidence; if it be curved, then the normal is the perpendicular to the tangent plane at that point. From these laws and geometrical considerations may be deduced all the propositions of catoptrics. In the present work, only those can be noticed whose truth can in a manner be exhibited to the eye, without any rigid mathematical proof. They are arranged under the heads *plane surfaces* and *curve surfaces*.

**Plane Surfaces**.—1. When a pencil of parallel rays falls upon a plane mirror, the reflected pencil consists of parallel rays. A glance at the annexed figure (fig. 1),

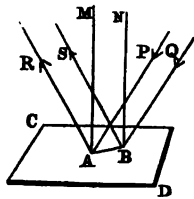


Fig. 1.

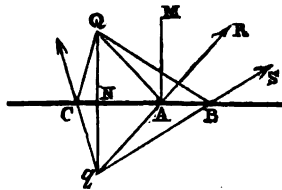


Fig. 2.

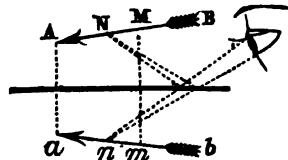


Fig. 3.

where PA and QB are two of the incident rays, and are reflected in the directions AR and BS respectively, will make the truth of this pretty clear to the eye. The proposition, however, may be rigidly demonstrated by aid of Euclid, book xi., with which, however, we shall not presume the reader to be acquainted. The reader may satisfy himself of its truth practically by taking a number of rods parallel to one another and inclined to the floor, and then turning them over till they shall again be equally inclined to the floor, when he will again find them all parallel.—2. If a diverging or converging pencil is incident on a plane mirror, the focus of the reflected pencil is situated on the opposite side of the mirror to that of the incident pencil, and at an equal distance from it. Suppose the pencil to be diverging from the focus Q (fig. 2), on the

mirror of the surface of which  $CB$  is a section. Draw  $QNq$  perpendicular to  $CB$  and make  $qN=QN$ , the  $q$  is the focus of the reflected rays. For let  $QA, QB, QC$  be any of the incident rays in the plane of the figure; draw the line  $AM$  perpendicular to  $CB$ , and draw  $AR$ , making the angle  $MAR$  equal to the angle of incidence,  $MAQ$ . Then  $AR$  is the reflected ray. Join  $qA$ . Now it can be proved geometrically, and indeed is apparent at a glance, that  $qA$  and  $AR$  are in the same straight line; in other words, the reflected ray  $AR$  proceeds as if from  $q$ . In the same way, it may be shown that the direction of any other reflected ray, as  $BS$ , is as if it proceeded from  $q$ ; in other words,  $q$  is the focus of reflected rays; it is, however, only their *virtual* focus. See art. FOCUS. If a pencil of rays converged to  $q$ , it is evident that they would be reflected to  $Q$  as their real focus, so that a separate proof for the case of a converging pencil is unnecessary. The reader who has followed the above will have no difficulty in understanding how the position and form of the image of an object placed before a plane mirror—as in fig. 8, where the object is the arrow  $AB$ , in the plane of the paper, to which the plane of the mirror is perpendicular—should be of the same form and magnitude as the object (as  $ab$  in the fig.), and at an equal distance from the mirror, on the opposite side of it, but with its different parts inverted with regard to a given direction. The highest  $a$ , for instance, in the image, corresponds with the lowest point,  $A$ , in the object. He will also understand how, in the ordinary use of a looking-glass, the right hand of the image corresponds to the left hand of the object.

When two plane mirrors are placed with their reflecting surfaces towards each other, and parallel, they form the experiment called the endless gallery. Let (in fig. 4) the arrow,  $Q$ , be placed vertically between the parallel mirrors,  $CD, BA$ , with their silvered faces turned to one another,  $Q$  will produce in the mirror  $CD$  the image  $q'$ . This image will act as a new object to produce with the mirror  $BA$  the image  $q''$ , which, again, will produce with the mirror  $CD$  another image, and so on. Another series of images, such as  $q', q'',$  etc., will similarly be produced at the same time, the

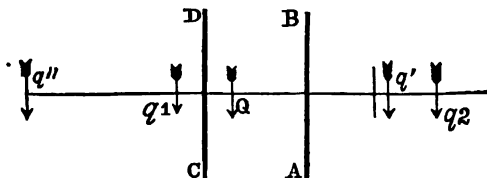


Fig. 4.

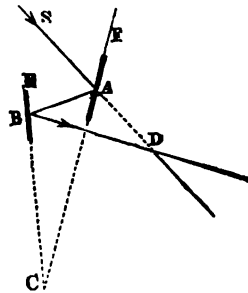


Fig. 5

first of the series being  $q'$ , the image of  $Q$  in the mirror  $BA$ . By an eye placed between the mirrors, the succession of images will be seen as described; and if the mirrors were perfectly plane and parallel, and reflected all the light incident on them, the number of the images of both series would be infinite. If, instead of being parallel, the mirrors are inclined at an angle, the form and position of the image of an object may be found in precisely the same way as in the former case, the image formed with the first mirror being regarded as a new (virtual) object, whose image, with regard to the second, has to be determined. For a curious application of two plane mirrors meeting and inclined at an angle an aliquot part of  $180^\circ$ , see art. KALEIDOSCOPE.—3. The two propositions already established are of extensive application, as has partly been shown. They include the explanation of all phenomena of light related to plane mirrors. The third proposition is one also of considerable utility, though not fundamental. It is: When a ray of light has been reflected at each of two mirrors inclined at a given angle to each other, in a plane perpendicular to their intersection, the reflected ray will deviate from its original course by an angle double the angle of inclination of the mirrors. Let  $A$  and  $B$  (fig. 5) be sections of the mirrors in a plane perpendicular to their intersection, and let their directions be produced till they meet in  $C$ . Let  $SA$ , in the plane of  $A$  and  $B$ , be the ray incident on the first mirror at  $A$ , and let  $AB$  be the line in which it is thence reflected to  $B$ . After reflection at  $B$ , it will pass in the line  $BD$ , meeting  $SA$ , its original path, produced in  $D$ . The angle  $ADB$  evidently measures its deviation from its original course, and this angle is readily shown to be double of the angle at  $C$ , which is that of the inclination of the mirrors. It is on this proposition that the important mathematical instruments called the quadrant and sextant (q.v.) depend.

**Curved Surfaces.**—As when a pencil of light is reflected by a curved mirror, each ray follows the ordinary law of reflection, in every case in which we can draw the normals for the different points of the surface, we can determine the direction in which the various rays of the pencil are reflected, as in the case of plane mirrors. It so happens that normals can be easily drawn only in the case of the sphere, and of a few

"surfaces of revolution," as they are called. These are the paraboloid, the ellipsoid, and the hyperboloid of revolution. The paraboloid of revolution is of importance in optics, as it is used in some specula for telescopes. See arts. SPECULUM and TELESCOPE. The three surfaces last named are, however, all of them interesting, as being for pencils of light incident in certain ways what are called surfaces of accurate reflection—i.e., they reflect all the rays of the incident pencil to a single point or focus. We shall explain to what this property is owing in the case of the parabolic reflector, and state generally the facts regarding the other two.

1. The concave parabolic reflector is a surface of accurate reflection for pencils of rays parallel to the axis or central line of figure of the paraboloid. This results from the property of the surface, that the normal at any point of it passes through the axis, and bisects the angle between a line through that point, parallel to the axis, and a line joining the point to the focus of the generating parabola. Referring to fig. 6, suppose a ray incident on the surface at P, in the line SP, parallel to the axis AFG. Then if F be the focus of the generating parabola, join PF. PF is the direction of the reflected ray. For PG, the normal at P, by the property of the surface, bisects the angle FPS, and therefore  $\angle$  (angle) FPG =  $\angle$  GPS. But SPG is the angle of incidence, and SP, PG, and FP are in one plane, and, therefore, by the laws of reflection, FP is the reflected ray. In the same way, all rays whatever, parallel to the axis, must pass through F after reflection. If F were a luminous point, the rays from it, after reflection on the mirror, would all proceed in a cylindrical pencil parallel to the axis. This reflector, with a bright light in its focus, is accordingly of common use in light-houses.

2. In the concave ellipsoid mirror there are two points—viz., the foci of the generating ellipse, such that rays diverging from either will be accurately reflected to the other. This results from the property of the figure, that the normal at any point bisects the angle included between lines drawn to that point from the foci.

3. Owing to a property of the surface similar to that of the ellipsoid, a pencil of rays converging to the exterior focus of a hyperbolic reflector, will be accurately reflected to the focus of the generating hyperbola.

The converse of the above three propositions holds in the case of the mirrors being convex.

Though the sphere is not a surface of accurate reflection, except for rays diverging from the center, and which on reflection are returned thereto, the spherical reflector is of great practical importance, because it can be made with greater facility and at less expense than the parabolic reflector. See art. TELESCOPE. It is necessary, then, to investigate the phenomena of light reflected from it.

4. *Spherical Mirrors.*—It is usual to treat of two cases, the one the more frequent in practice, the other the more general and comprehensive in theory. First, then, to find the focus of reflected rays when a small pencil of parallel rays is incident directly on a concave spherical mirror. Let BAB' (fig. 7) be a section of the mirror, O its center of curvature, and A the center of its aperture. AO is the axis of the mirror, and therefore of the incident pencil, because it is incident directly on the mirror; a pencil being

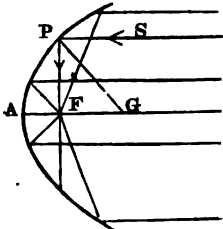


Fig. 6.

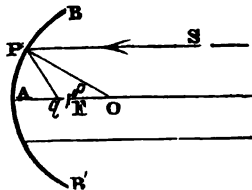


Fig. 7.

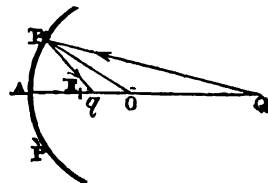


Fig. 8.

called oblique when its axis is at an angle to the axis of the mirror. As the ray incident in the line OA will be reflected back in the same line—OA being the normal at A—the focus of reflected rays must be in OA. Let SP be one of the rays; it will be reflected so that  $\angle$  QPO =  $\angle$  SPO. But  $\angle$  PQO =  $\angle$  OPS by parallel lines. Therefore,  $\angle$  QPO =  $\angle$  QOP, and Pq and Oq are equal. If, now, the incident pencil be very small—i.e., if P be very near A—then the line Pq will very nearly coincide with the line OA, and Pq and Oq will each of them become very nearly the half of OA. Let F be the middle point of OA—the point, namely, to which q tends as the pencil diminishes. The F is called the principal focus of the mirror, and AF the principal focal length, which is thus =  $\frac{1}{2}$  radius of the mirror. It will be observed that when AP is not small, q lies between A and F. Fq is called the aberration of the ray. When AP is large, the reflected rays will continually intersect, and form a luminous curve with a cusp at F. This curve is called the caustic (q.v.). We shall now proceed to the more general case of a small pencil of diverging rays, incident directly on a concave spherical mirror. Let PAP' (fig. 8) be a section of the mirror, A the center of its aperture, O of its curvature, and let F be its principal focus. Then, if Q be the focus of incident rays (as if proceeding from

a candle there situated),  $q$ , the focus of the reflected rays, lies on  $QOA$ , since the pencil is incident directly, and the ray  $QOA$ , being incident in the line of the normal  $OA$ , is reflected back in the same line. Let  $PQ$  be any other ray of the pencil. It will be reflected in  $Pq$ , so that  $\angle QPO = \angle OPQ$ ; and on the supposition that  $PA$  is very small, so that  $QP$  becomes nearly equal to  $QA$ , and  $qP$  to  $qA$ , it can be shown, by Euclid, vi. 8, that  $\frac{QO}{QA} = \frac{qO}{qA}$  very nearly. From this equation is deduced the formula  $qA = \frac{QA \times AF}{QA - AF}$ , which enables us to find  $qA$ , when  $QA$  and  $AF$  are known. Thus, let the radius of curvature be 12 in., and the distance of the source of the rays, or  $QA$ , 30 in., the focal length  $qA = \frac{30 \times 6}{30 - 6} = 7\frac{1}{2}$  inches. If the rays had diverged upon  $q$ , it is clear they

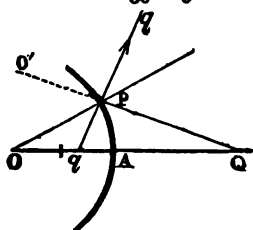


Fig. 2.

would have been reflected to  $Q$ . The points  $Q$  and  $q$ , accordingly, are called conjugate foci.

If the mirror be convex, as in fig. 9, instead of concave, and a pencil of diverging rays be incident directly on it from  $Q$ , we should find, proceeding in exactly the same way as in the former case, the equation  $Aq = \frac{QA \times AF}{QA + AF}$ ; or taking the same numbers as before;  $qA = \frac{30 \times 6}{30 + 6} = 5$  inches.

For information regarding the formation of images by spherical mirrors, the reader may consult Potter's *Elements of Optics*. See also MIRRORS.

By considering fig. 8, it is easy to see how the relative positions of the two conjugate foci, as they are called,  $Q$  and  $q$ , vary as the distance,  $AQ$ , of the origin of the rays is changed. As  $Q$  is advanced towards  $O$ ,  $q$  also approaches  $O$ , since the angles  $QPO$  and  $qPO$  always remain equal; and when the source of the light is in the center,  $O$ , of the sphere, the reflected rays are all returned upon the source. As  $Q$ , again, recedes from  $O$ ,  $q$  moves towards  $F$ , which it does not quite reach until the distance of  $Q$  is infinite, so that the incident rays may be considered as parallel, as in fig. 7. If  $Q$  is placed between  $O$  and  $F$ , then  $q$  will be to the right of  $O$ ; and when  $Q$  coincides with  $F$ , the reflected rays will have no focus, but will be parallel. If  $Q$  is between  $F$  and  $A$ , the reflected rays will diverge, and will have their virtual focus to the left of  $A$ . The correctness of these deductions may easily be verified. The positions of the conjugates are traced in precisely the same way for the convex mirror.

**CATOPTROMANCY**, divination by the mirror or looking-glass. At Patras, in Greece, the sick foretold their death or recovery by means of a mirror let down with a thread until its base touched the water in a fountain before the temple of Ceres. The face of the sick person appearing healthy in the mirror betokened recovery; if it looked ghastly, then death was sure to ensue. More modern superstitions attach ill-luck to the breaking of a looking-glass, and to seeing one's face in a glass by candle-light.

**CATO STREET CONSPIRACY**. A plot formed in 1820 by Thistlewood, Ings, Tid, Brunt and others, with the design of murdering Lord Castlereagh and the other ministers, setting fire to London, seizing the Bank and Mansion House, and proclaiming a provisional government. The conspirators had already fixed the day for the execution of their plans, when they were attacked by the police while they were arming themselves in a stable in Cato street. Thistlewood, the ringleader, was executed with four others. Five more were transported for life.

**CAT-RIG**. See CAT-BOAT.

**CATS, JACOB**, a Dutch statesman and poet, was b. at Brouwershaven, in Zeeland, in 1577, and, after studying law, finally settled at Middelburg. He rose to high offices in the state, and was twice sent as ambassador to England, first in 1627, and again in 1652 while Cromwell was at the head of affairs. He died 1660. As a poet, he enjoyed the highest popularity. His poems are characterized by simplicity, rich fancy, clearness and purity of style and excellent moral tendency. The most highly prized of his productions were the *Huwelyk, Trouwringh* (a series of romantic stories relating to remarkable marriages), and the *Spiegel van den Ouden in Nieuwen Tyd*. The best edition of his works appeared at Amsterdam, in 19 vols., 1790-1800.

**CAT'S-CRADLE**. See CRATCH CRADLE.

**CAT'S-EYE**, a beautiful mineral, a variety of quartz receiving its name from the resemblance which the reflection of light from it, especially when cut *en cabochon*, or in a convex form, is supposed to exhibit to the light which seems to emanate from the interior of the eye of a cat. It has a sort of pearly appearance, and is *chatoyant*, or characterized by a fine play of light, which results from the parallel arrangement of the minute fibres of the stone itself, or from an intimate mixture of some foreign substance, such as amianthus. It has been supposed that cat's-eye is silicified wood. It is of various colors, and is obtained chiefly from Malabar and Ceylon. The Singhalese are especially proud of it, believing it, although erroneously, to be only found in their island.

**CATSKILL**, village and co. seat of Greene co., N. Y., on the w. bank of the Hudson, at the mouth of Catskill creek, 34 m. s. of Albany. Pop. '90, 4,920. It is on the West Shore railroad; is the starting-point of a railroad to the Catskill mountains, and is connected with the Hudson River railroad by a ferry to Catskill station. It has a court-house, opera house, free academy, national banks, churches, public school library, daily and weekly newspapers, large hotels, several bridges, and manufactures of woolens, paper, etc.

**CATSKILL GROUP**, in geology, the name of rocks of the Devonian system seen in the northern counties of Pennsylvania. They are chiefly red sandstone and shale, and contain fossil scales of the earliest fishes. The Catskill mountains were formerly supposed to belong in this group, whence the name, now known to be inappropriate.

**CATSKILL MOUNTAINS**, a part of the Appalachian system w. of the Hudson river, mostly in Greene co., N. Y. The group, about 12 m. long, nearly parallel with the river about, 8 m. distant, turns westward in spurs extending many miles. Besides the Ulster and Delaware railroad, beginning at Kingston and leading w. into the mountains, there is a good wagon road from Catskill village to the "Mountain House," 12 m. w., which is a favorite summering place. The house stands on a terrace 2,231 ft. above the river, and almost at the edge of a perpendicular cliff several hundred ft. high. There is another public house on Overlook Mountain, a few miles to the s., which is estimated to be 3,900 ft. above tide. The views from these houses and from the neighboring peaks are wonderfully varied and beautiful, reaching from the Green mountains in Vermont to the highlands at West Point, and taking in nearly 100 m. of the Hudson river and valley, with numerous cities and villages, and a vast expanse of highly cultivated farming country. An immense number of summer boarders are accommodated through all this region, not only in hotels, but also in countless farm-houses and village homes. One of the highest points is the top of Overlook, 3800 feet. The other prominent elevations are Hunter Mountain, High Peak, and Round Top. One of the sights of the region is "The Clove," or ravine, and the falls therein. The ravine is about 5 m. long. At its head two rivulets unite and flow rapidly to a point where the mountain divides and forms a deep hollow into which the brook rushes over a cascade of 180 ft.; and further down are other falls, one of 80 and another of 40 feet. The ice formation in winter around the highest fall is particularly grand and beautiful. There are other ravines and water-falls in the region, but none equally important. The mountains are for the most part covered with thick forests of oak, hickory, ash, maple, beech, pine, etc.

**CAT'S-TAIL**. See **TYPHA**.

**CAT'S-TAIL GRASS**. See **TIMOTHY GRASS**.

**CATTACK**. See **CUTTACK**.

**CATTARAUGUS**, a co. in w. New York, on the Pennsylvania border, watered by the Allegheny and other rivers, and intersected by branches of the New York and Erie railroad; 1356 sq. m.; pop. '90, 60,866. The surface is undulating and the soil fruitful. The chief products are wheat, corn, oats, potatoes, hay, cheese, butter, wool, hops, and maple sugar. Iron, manganese, marl, peat, and sulphur are found. Co. seat, Little Valley.

**CATTARO**, a t. of Austria, in the crown-land of Dalmatia, is situated at the head of the gulf of Cattaro, about 36 m. s.e. of Ragusa. It is strongly fortified, and surrounded on all sides by mountains. The castle, a massive and almost inaccessible building, stands on a precipitous rock immediately behind the town. C. has a cathedral several churches and hospitals, and a population of 4,000. C., which was at one time the capital of a small republic, was in 1807 annexed to the kingdom of Italy, but was handed over to Austria in 1814 by the treaty of Vienna.—**CATTARO, GULF OF**, or **BOCCA DI CATTARO**, an inlet of the Adriatic, near the s. extremity of the Dalmatian coast. It consists of three basins or lakes, connected by straits of about half a mile in breadth. The outer entrance is only a mile and a half wide, and the total length of the gulf is about 80 miles. Mountains protect it from all winds, and it has a depth of from 15 to 20 fathoms.

**CATTEGAT**, or **KATTEGAT** (*Sinus Codanus*), the bay or arm of the sea situated between the e. coast of Jütland and the w. coast of Sweden, to the n. of the Danish islands. It is connected with the Baltic sea by the Great and Little Belt (q.v.), and by the sound. The Skager Rack (q.v.) connects it with the North sea. The length of the C. is about 150 m., and its greatest breadth 85 miles. It is of unequal depth, and has dangerous sand-banks. The principal islands are Læsø, Samsø, and Anhalt. The Danish shores of the C. are low, but the Swedish shore is very steep and rocky.

**CATTERMOLE, GEORGE**, one of the most distinguished of English painters in water-colors, was born at Dickleburgh, Norfolk, in 1800. His pictures, which embrace a wide range of subjects, are remarkable for their striking originality of conception, vigorous execution, and fine color and tone. One of his best known and greatest pictures is "Luther at the Diet of Spire," containing 33 portraits of the principal characters, copied from the authentic originals by the old masters. He also designed the engravings for his brother's *History of the Civil Wars*, and illustrated many scenes in Scott's novels and in Shakespeare. His later works are chiefly oil-paintings. He d. July 24. 1868.



**CATTI**, or **CHATTI**, a German people, included by Cæsar under the name Suevi (q. v.), who inhabited a country pretty nearly corresponding to the present Hesse. The south-western part of their territory, around *Mattiacum*, was conquered by the Romans under Drusus. The C. took part in the general rising of the Germans under Hermann. Tacitus praises them as excellent foot-soldiers. During the reign of Marcus Aurelius, in the end of the 2d c., they made incursions into Roman Germany and Rætia. Caracalla failed in an expedition against them and the Alemanni in the 3d century. About the middle of that century, their name began to give place to that of the Franks (q. v.), and is last mentioned by Claudian in the latter part of the 4th century.

**CATTLE.** See Ox.

**CATTLE**, in American law. See **CHATTLE**.

**CATTLE-PLAGUE**, **RINDERPEST** (Ger.), or **STEPPE MURRAIN**, is a contagious eruptive fever, or exanthema, of the bovine species; sheep, goats, deer, and other allied species occasionally, however, catch it from cattle. It occurs indigenously on the plains of western Russia, whence it has at various times overspread most parts of the old world. The specific virus from diseased or infected animals is the only source of cattle-plague; no filth, overcrowding, or other health-depressing cause has hitherto produced it. As in small-pox, scarlatina, and other eruptive fevers, an incubative stage, varying between two and twenty days, intervenes between the introduction of the virus into the system, either by inoculation or contagion, and the development of the characteristic symptoms. These consist essentially of congestion of the mucous and cutaneous surfaces, with a sort of aphthous eruption, and thickening, softening, and desquamation of the superficial investing membrane. The disease runs a tolerably fixed and definite course, which is not materially altered by any known remedial measures. It seldom attacks the same individual a second time.

*History.*—The cattle-plague has been recognized for upwards of a thousand years. It appears to have destroyed the herds of the warlike tribes who overran the Roman empire during the 4th and 5th centuries. About 810, it traveled with the armies of Charlemagne into France, and about the same period is also supposed to have visited England. Several times throughout the course of every century it spread from the plains of Russia over the western countries of Europe, and is stated to have again visited England about 1235. Although occasioning, every few years, great losses on the continent of Europe, the plague does not appear to have again shown itself in England until 1714, when it appeared at Islington about the middle of July, was very destructive for about three months, but was again got rid of towards Christmas. In 1744, it was in Holland, destroying there, in two years, 200,000 cattle; in Denmark, from 1745–49, it killed 280,000; in some provinces of Sweden it spared only 2 per cent of the horned cattle. It made terrible havoc throughout Italy, destroying 400,000 beasts in Piedmont alone. In April, 1745, the plague was again imported into England, probably by some white calves from Holland, where, as already stated, it had for some time prevailed. It continued its devastations for twelve years, but it is now impossible accurately to discover the losses it occasioned. In the third and fourth years of its ravages, 80,000 cattle were slaughtered, and double that number are supposed to have died. In 1747, 40,000 cattle died in Nottingham and Lancashire alone; whilst, so late as 1757, 30,000 perished in Cheshire in six months. In March, 1770, the disease was brought with some hay from Holland to Portsoy, in the Moray firth; several cattle died, and others, to the value of £799, 12s. 2d., being destroyed, the further spread of the pest was prevented. By the wars which wasted Europe towards the close of the last and first eighteen years of the present century, cattle-plague was spread widely over the continent, and occasioned, wherever it occurred, terrible losses. Since then, at short intervals, it has spread—always being traceable to its source on the Russian plains—over Poland, Hungary, Austria, Prussia, portions of Germany and Italy, and has extended to Egypt. It has also reached China and Japan.

The British outbreak of 1865–67, like its predecessors, undoubtedly came from Russia. The steamer *Tonning*, from Revel, brought 331 cattle and 330 sheep into Hull on 29th May, 1865. A portion of the cattle had come from the interior of Russia, where the plague then was, or recently had been; the cargo was rapidly landed, and very hurriedly inspected. Nearly half of the cattle were distributed in various lots to butchers in Leeds, Derby, and Manchester, but, curiously, these do not appear to have left any contagion in their trail. One hundred and seventy-five came to London, remained from the Monday evening until Thursday's market in lairs at York road, adjoining the cattle-market. It was stated, in a leader in the *Times* of 15th Aug., that rinderpest was seen in the metropolitan market as early as 12th June. Certain it is that more than one lot purchased on 19th June carried the disease to several dairies in and about London. The first cases were mistaken for cases of poisoning, the cows they had stood beside were sent into market, and thus the subtle disorder in a few weeks spread into many dairies both in town and country. Twenty-three Dutch cattle, having stood over for several markets, were sent back to Holland on 2d July, carried with them the contagion, were placed in a field near Schiedam, but soon sickened and died, thus spreading the disease in Holland. During the next six months, plague was repeatedly reimported thence into England. Until 11th Aug., 1865, no restrictions whatever were

put upon the removal of cattle; diseased and infected animals were freely taken to fairs and markets, were openly traveled by road and rail; whilst the metropolitan market continued every week to send forth infected cases, not only to the neighboring counties, but to Southampton, Birmingham, Hereford, Liverpool, Edinburgh, and even to Aberdeenshire. As early as 18th July, the pest was brought from London to Huntly by four calves; subsequent outbreaks occurred in the same way. The stamping-out system was, however, early and rigidly enforced in Aberdeenshire, and eight distinct outbreaks were promptly got rid of.

In Edinburgh, it appeared probably about 9th Aug., was brought from London by some low-priced foreign cows; in six weeks, about 800, or one half the dairy cows in Edinburgh, had died—200 having been buried in one trench. By the end of Jan., four fifths of the dairy cows had perished, but Edinburgh was reported clear. In Glasgow, the first case occurred on 19th Aug., in a cow sent from Edinburgh. By 30th Sept., 432 cases were reported, and it continued to spread. By the middle of Oct., it was in Mr. Harvey's valuable stock of 800, of which 25 died in one night, and to save further loss, 50 healthy animals were in one day disposed of to the butcher. From Falkirk Trysts, as from Barnet, Norwich Hill, and other large English fairs, the disease was transmitted into fresh localities. From the autumn trysts, it was carried into Perthshire, Forfarshire, and Fifeshire. Diseased cattle passing along in railway trucks, appear to have spread the contagion over the fields adjoining the line at Thornton, Fifeshire. Into West Lothian it was conveyed in early Sept. by lambs from the Edinburgh market.

The rapid spread of the insidious disorder may be gathered from the fact that, whilst, during the week ending 24th June, 1865, there was only one outbreak at Mrs. Nicholl's dairy at Islington, and 30 animals affected, by 30th Sept. there were 1702 farms, sheds, or other places in which the pest had appeared, and 13,268 animals had been attacked. Three months later, 8252 separate places had been visited, and 62,743 animals attacked. During six months, the aggregate of cattle attacked was 76,002. During the three months to 30th Mar., 18448 farms and other premises had been infected, and 147,275 cattle attacked. In Dec., 1865, the fresh cases each week reached 9000; but in spite of remedial and preventive measures, of orders in council, and restrictions on the movement of stock, the number of weekly cases steadily increased to 15,706 in the third week of Feb. "The cattle diseases prevention act," passed 20th Feb., 1866, and the advantages flowing from the restrictions thus tardily imposed on the trade in cattle, and the slaughter of diseased and infected animals, were speedily apparent. In four weeks, the number of cases was reduced by one half. During the three months ending 30th June, 23,276 cases were reported; during the next three months to 30th Sept., the numbers fell to 2108; whilst, to 29th Dec., the three months' cases were but 149; to 30th Mar., 1867, 89 new cases were noted. Throughout April and May the number of cases continued steadily to decline; but during the week ending 25th May a fresh outbreak occurred in the Finsbury district of the metropolis, and 81 animals died, or were slaughtered to prevent the further spread of the pest. With the exception of an isolated outbreak in Essex, which was promptly stayed by slaughter of the ailing and suspected animals, the country was free of plague during August. The following are the records of its destructive career during 1865-67:

	Attacked.	Killed.	Died.	Recovered.
England.....	233,678	102,740	90,450	21,589
Wales.....	8,368	1,180	5,794	1,117
Scotland.....	46,868	6,268	28,088	10,707
Total....	278,923	110,188	124,332	33,413

To this sad total must be added 11,000 cases known to have been attacked and unaccounted for, and upwards of 60,000 healthy cattle slaughtered to prevent the spread of the disease. Plague was again imported into Hull in Aug., 1872; it was brought with cattle from Cronstadt; it spread into several districts of the East Riding, attacked 72 animals, 51 of which were killed, and 21 died. In 1877, an outbreak took place in Germany, but by energetic measures was speedily suppressed without extensive losses.

*Causes.*—The development of cattle-plague by filth, overcrowding, miasmata, hot weather, or other such causes, is untenable. Faulty hygiene, by lowering vitality, probably renders the animal more prone to the attack, and less able to bear up against it, but it cannot originate plague. Like hydrophobia, small-pox, or syphilis, it is developed only by the special virus, which appears to have its habitat on the Russian steppes. This virus occurs abundantly in the blood of every plague-stricken beast, in the discharges from its nostrils, mouth, or eyes, in the off-scourings from the bowels, probably even in the breath. It may be transferred to healthy beasts by inoculation. A little of the blood or nasal or other mucous discharges of a plague case, if introduced underneath the skin of a healthy cow, develops the disease within a few days. The transference of the virus or contagion from the sick to the sound animal, is not always so direct and evident. As with other catching diseases, the virus may be carried considerable distances in the air; its particles are minute, but they have powerful vitality; it may adhere to the food that has lain before infected beasts; to the litter from the stalls, or even after it has been heaped for weeks; to the clothes of attendants; to the floors, walls, or stalling of build-

ings; to imperfectly cleansed cattle-trucks. So subtle and potent is the plague poison, and so endowed with the power of self-multiplication and growth, that a very minute portion of it finding access to the blood of a healthy animal of the bovine race increases so rapidly, that to use the words of the commissioners' report, No. III. p. 4, "the whole mass of the blood, weighing many pounds, is infected; and every small particle of that blood contains enough poison to give the disease to another animal." It may gain access to the blood probably through the air-passages, perhaps also by absorption through the mucous surface of the bowels, or even through the skin.

*Symptoms.*—In from three to six days after an animal has been exposed to the virus of cattle-plague, or about 36 to 48 hours after being purposely inoculated, the temperature of the body is raised by several degrees. A delicate thermometer introduced into the vagina or rectum, instead of marking about 102° F., indicates 104° to 106°. As yet the appetite, secretion of milk, breathing, and pulse are scarcely if at all affected, and but for the elevation of temperature, accompanied sometimes by dullness, the animal might be supposed to be in the best of health. Two or three days later, or usually within six or eight days after the beast has taken in the subtle virus, the mucous membrane of the mouth is generally observed to be slightly reddened, and soon a granular yellowish-white eruption, consisting of thickened epithelium cells and granules, appears on the gums round the incisor teeth, and by and by on the lips and dental pad. Some hours later, the same eruption extends to the cheeks, tongue, and hard palate. Within 48 hours, or about the sixth day of attack, a crust of epithelium covers the gums, lips, and mouth, and when wiped away, or accidentally rubbed off, leaves the abraded membrane red and vascular, and exhibiting patches of erosion. The membrane lining the vagina indicates very similar appearances; it is reddened and vascular, dotted with grayish translucent elevations about the size of rape-seeds, covered with a whitish-yellow, usually sticky discharge, and occasionally marked with patches of excoriation. The skin, like the mucous surfaces, is congested; there is hence a perverted development of scarf skin, and of the oleaginous secretion of the irritated sebaceous glands. The skin is thus invested with a furfuraceous desquamation; whilst on its thinner portions about the lips, between the thighs, and on the udder, there are papular eruptions or elevations. About two, or even three days after the temperature has been increased, and usually one, or even two days after the appearance of the characteristic eruption on the gums, the constitutional symptoms present themselves. The animal is dull, hangs its head, arches its back, the eyes are leaden and watery, and from both eyes and nose there latterly comes a dirty almy discharge. Appetite and rumination are irregular, and in dairy cows, the secretion of milk rapidly abates. The breathing, especially towards the sixth day, is oppressed, expiration is prolonged, and accompanied by a peculiar grunt. The pulse is small and thready, and quickened as death approaches. The bowels, usually at first confined, become, towards the sixth or seventh day, much relaxed; the discharges passed, often with pain and straining, are profuse and liquid, offensive, acrid, pale colored, and occasionally mixed with blood. The patient loses weight and strength, totters if it attempt to walk, and prefers to lie rather than to stand. Death usually occurs about the seventh day, and is preceded by muscular twitchings, a peculiar sickly, often offensive smell, a cold clammy state of body, moaning, grinding of the teeth, and rapidly increasing prostration.

*Prognosis.*—Cases usually terminate unfavorably when about the fifth or sixth day the animal temperature falls rapidly; the pulse becomes small, quick, and weak; the breathing more difficult, distressed, and moaning; the diarrhea increased; and the depression more notable. A more favorable termination may be anticipated when, after the fifth day, the heightened temperature, so notable even from the earliest stages, abates gradually; the breathing becomes easier; the pulse firmer; the visible mucous membranes appear healthier; and patches of extravasation or erosion speedily disappear.

Sheep do not take rinderpest spontaneously, and even when kept with diseased cattle, or inoculated with cattle-plague virus, they do not catch the disease so certainly as cattle do. When diseased, they exhibit, however, very similar symptoms, but professor Röhl, and other observers, record that upwards of 40 per cent recover. Goats, deer, antelopes, gazelles, yaks, and indeed all animals taking rinderpest, exhibit with tolerable uniformity the same characteristic symptoms.

*Post-mortem Appearances.*—The mucous membranes are generally deeper colored than natural, are congested, softened, marked in places with the same granular patches discoverable during life within the mouth and the vagina, and in bad cases exhibit oedema, hæmorrhage, and sloughing. The first three stomachs sometimes contain a good deal of food, but show less declension from health than the fourth stomach, of which the mucous membrane is dotted with spots of congestion and extravasation. The coats of the bowels are thinned and easily torn. The mucous coat, especially towards the middle of the small intestines, the opening into the cæcum, and posterior half of rectum, is much congested, bared of epithelium, and sometimes ecchymosed, but never ulcerated. Peyer's glands, so generally inflamed in the somewhat analogous typhoid fever of man, are perfectly healthy. The liver, spleen, and pancreas seldom present any special appearances. The respiratory mucous membrane, like the digestive, is vascular, and marked with submucous hæmorrhage; the lungs are generally emphysematous, the heart often marked with petechial spots. The urino-genital, like the other

mucous membranes, is congested in females, especially towards the lower part of the vagina and vulva; the kidneys are sometimes rather softened, the serous membranes and nervous centers are perfectly unchanged. Dr. Beale, by his microscopical observations, discovers in the capillaries a great increase of nuclear or germinal matter, and white blood-corpuscles, which he believes may account for the local congestion. The blood itself is dark in color; in the later stages it contains less water, probably owing to the draining diarrhea, and about double its usual proportion of fibrine. The muscular tissues are softened, easily broken down, and contain an abnormal amount of soluble albumen. The urine is little altered in quantity, but from the first rise in the animal temperature, it contains an increase of urea varying from 5 to 15 per cent. The chief change in the milk is its rapid diminution in quantity, and the increase of its fatty matters. The bile is watery, offensive, and prone to decomposition.

*Treatment.*—Cattle-plague is proved to be an eruptive fever. When the specific poison, on which such disorders depend, has entered the body of a susceptible subject, no remedy has yet been discovered which can destroy it, or even materially shorten or mitigate its effects. Until such an antidote is found, there can be no hope of certain cure. The cattle-plague commissioners have collected information regarding the four following methods of treatment—namely, the antiphlogistic, the tonic and stimulant, the antiseptic, and the special. Diverse as are these systems, the percentages of recoveries, varying from 25.83 to 27.45, were so nearly alike, that it is fair to conclude that no one of the systems tried exercised any notable influence in checking the mortality. Partly, perhaps, from the varying virulence of the plague, partly from differences in the nursing and care bestowed on the animals, the proportion of recoveries has varied greatly in different localities. Up to the end of 1865, in Huntingdon they were only 4.668 per cent; in Norfolk they were 12.102; in Flint, 15.909; in Scotland, 19.889; whilst in Fife they reached 24.552; and in Yorkshire, 29.731 per cent.

Like small-pox, measles, and other eruptive fevers in man, rinderpest runs a definite course which cannot safely be interfered with. Rational treatment is therefore limited to warding off untoward symptoms, to careful nursing, and husbanding the falling strength. It must, however, be remembered that throughout the progress of the disease there is constantly given off from the sick body minute particles, which are capable of developing the disorder in healthy cattle. Hence plague-subjects, by the orders in council, are very properly desired to be immediately destroyed. Except, therefore, for purely scientific purposes, and with careful precautions to prevent the spread of the poison, it is unwise to attempt remedial treatment. Where, however, a beast is to have a chance of recovery, so soon as the elevated temperature indicates the accession of the disease, solid indigestible food should be withheld, and the patient restricted to mash, gruel, boiled linseed, malt, and other food, which can be digested without the necessity for rumination. The paramount importance of such a dietary is clearly demonstrated in the returns of the Edinburgh cattle-plague committee to the government commissioners. The recoveries amongst 810 cattle "fed with dry food, and treated medicinally with drugs," were 18.6. Amongst 303 cattle treated with mixed food and hay, 23.2 recovered. Where mashes were given during sickness, but dry food supplied during convalescence, the recoveries reached 51.5; whilst in 95 cottagers' cows, whose chief ordinary dietary consisted of mashed food, and which were fed in the same manner throughout both sickness and convalescence, and were besides carefully nursed but not doctored, the recoveries reached 73.7. Where the bowels at the outset are costive, a dose of oil, or a very small quantity of some saline purgative, may be required. Cold water, gruel, mashes, or stale bread soaked either in water or beer, should be offered at short intervals throughout the attack. The animal, kept in an atmosphere of about 60°, should be comfortably clothed, and have its legs bandaged. The hot-air bath and wet-packing has been repeatedly tried, but although probably useful in the earlier stages, appear, when the disease is fully established, to harass and weaken the patient. Small and repeated doses of sulphite of soda have in some cases proved useful, and may be conjoined with carefully regulated moderate doses of such stimulants as ale, whisky and water, sweet spirit of niter, spirit of ammonia, or strong coffee. It is most important, however, that these and other such medicines should be drunk by the animal of its own accord in its gruel, water, or mashes, as the forcible horning over of drenches always disturbs the patient. The inhalation of chloroform, although temporarily relieving the distressed breathing, does not appear to exert any permanent benefit.

*Prevention.*—From what has been stated regarding the nature of cattle-plague, it must be evident that its prevention can only be effected by the destruction of the specific virus, or by removing beyond its influence all animals on which it might fasten. Sparks fall harmless where no inflammable materials lie within reach, and there are many such materials. Neither should sheep, fresh hides, hay, nor any other fodder and litter from countries where this ruinous plague exists, or has recently visited, be allowed to enter British ports. This very obvious precaution took strong hold of the public mind, and the practical result is, that importations of cattle-plague are guarded against by the provisions of the contagious diseases (animals) acts, 1869 and 1878. Neither cattle, sheep, nor pigs, fodder, litter, or hides, can be landed from countries where the plague exists, or from places in direct communication with such infected countries. All foreign stock is

inspected at the ports of debarkation, and inspectors have orders for the immediate slaughter and disinfection of cattle-plague subjects, and of any animals with which they have been in contact. But even with such precautions, foreign cattle frequently bring with them catching disorders, notably foot-and-mouth disease. Since they constitute, however, less than 5 per cent of the total cattle stock of the country, such risks should be removed by converting the foreign cattle traffic into a dead-meat trade.

Rinderpest being found to resemble smallpox in men and sheep, it was thought that its propagation and virulence might be abated by vaccination with cowpox lymph; but cattle, even when effectually vaccinated, which is often a difficult task, readily take rinderpest, often in its most mortal form.

Several outbreaks of splenic, or "Texan" fever (rinderpest), have occurred in the U. S. during the last half of this century. An epidemic raged in Ohio in 1877, and the fever destroyed much valuable stock in New York in 1882. The herds were quarantined and the sale of meats from the infected districts was prohibited. In this disease the animals are covered with ticks whose bite is deadly, as it impregnates the blood which flows to the liver, destroying the membrane and damaging the functions of the kidneys and bladder. The symptoms of C. P. are: a decided diminution of milk, and the presence of blood in the urine. In 1883, the board of medical and scientific experts, appointed by the agricultural department to prepare a report on the epidemic diseases among cattle in the U. S., said that the propagation of splenic fever among cattle in the southern Atlantic and Gulf states occurs only in summer, or early autumn, and seldom after a heavy frost. The British market was closed in that year against importations of American cattle; and the Treasury cattle commission concluded its report thus: "Nothing short of the absolute and undeniable extinction of this disease in the U. S. will reopen the British market to our live cattle." This disease is frequently confounded with pleuro-pneumonia, which has, up to this time, confined its ravages to the states east of the Alleghanies. The seat of the plague, in pleuro-pneumonia, is the lung. The commission appointed, 1882, reported that the ultimate source of lung plague was unknown; that it had prevailed in Europe from time immemorial, that it was brought to this country, 1848, by an infected cow, landed in Brooklyn; that it is invariably epidemic, never sporadic; and that consequently, if once exterminated, it will not appear again, unless through fresh infection. Pleuro-pneumonia was very prevalent in N. J. and N. Y., 1879. Prof. Law, of Cornell univ., was commissioned by the governor of N. Y. to investigate the disease, and, in connection with Gen. Patrick, rendered valuable services in securing its extermination—the state appropriating \$10,000 for this purpose. Up to 1879, the British loss from C. P. was estimated at \$500,000,000; and Prof. Law claims that if the contagion in this country should ever become general, it would be more expensive than a civil war. Our yearly losses, from the lung plague alone, are estimated at from \$2,000,000 to \$3,000,000, and the prospective loss at \$50,000,000. Purulent discharge from the nose is always a sign of an aggravated attack of pleuro-pneumonia; and cattle showing this symptom should invariably be killed. Inoculation at the tail of healthy animals, as soon as the disease appears in a herd, has been practiced with success; but Prof. Law disapproves of the custom, as the virulent poison is apt to be diffused through the air in the process, lodging in the fodder, etc., while the inoculation gives immunity for two years only. Carbolic acid administered in a very diluted state, in drinking water, and sprinkled about, in a crude form, destroys infection, killing the virus, as well as acting as a disinfectant. It should be placed in water, in the proportion of one part of pure acid, with thrice its weight of sal soda, to 1000 parts of water. Some preventive legislation has been attempted on this important subject; but the prompt action of some states, as N. Y., in endeavoring to stamp out the disease, has been offset by the negligence of other commonwealths in not providing proper laws for the protection of cattle. During the epidemic of 1879, the absence of legislation in Va., Del., and Md., rendered the success of the efforts of the N. Y. authorities very dubious. A bill was before the U. S. senate, 1881, to prevent the introduction and dissemination of communicable diseases among domestic animals. It prohibited, under heavy penalties, the introduction of diseased meats from foreign countries, or their transfer from state to state; and it authorized absolute embargo against the importation of meats from infected states. A somewhat similar bill was passed by both houses of congress, 1883.

*Authorities.*—Reports of British commissioners, Nos. I., II., III., and IV.; *The Cattle Plague*, by Prof. Gamgee; *Die Rinderpest*, by Roloff.

**CATTOLICA**, a t. of Sicily, in the province of Girgenti, and 14 m. n.w. of the city of that name. It has extensive sulphur-works, and a pop. of 7,200.

**CATTY** (Malayan, *kati*; Japanese, *kin*), the unit of weight used throughout Chinese and Malayan Asia, and by the Chinese all over the world. American scales exported to Asia are graduated into catties. A catty is 1½ pounds avoirdupois.

**CATTYWAR**. See **KATTYWAR**.

**CATULLUS, VALERIUS**, a celebrated Roman lyricist, was b. at Verona, 87 B.C. His father was an intimate friend of Julius Caesar, and the young poet must have frequently met the great warrior at the paternal residence, when the latter was on his way to Gaul. In early life, he went to Rome, where his career was that of an Epicurean, and the expense of this kind of living soon involved him in pecuniary difficulties. To release

himself from these, he followed the prætor Memmius to Bithynia, with the intention, like his superior, of wringing a fortune out of the provincials. This fashionable but felonious method of acquiring money did not succeed in C.'s case, mainly, however, through the more dexterous cupidity of Memmius. After his return, C. appears to have lived mostly in Rome, and in very straitened circumstances. When he died is unknown. His poems, 118 in number, chiefly consisting of lyrics and epigrams—first brought to light by Benvenuto Campesani of Verona in the beginning of the 14th c.—have always been justly admired for their exquisite grace and beauty of style; but are, in many places, grossly indecent. In higher styles of writing, C. was equally successful, especially in his odes, of which, unfortunately, only four have been preserved. His heroic or narrative poem on the marriage of Peleus and Thetis—consisting of more than 400 hexameter lines—and the wild enthusiastic poem entitled *Alys*, are especially worthy of notice. Most of the earlier editions of C. include the works of Tibullus and Propertius. The best modern editions are by Sillig (1823), Lachmann (1829), and Ellis (1867 and 1869). There are English translations by Lamb (1821), Martin (1861), Cranstoun (1867), etc. See Munro's *Criticisms* (1878).

**CATULUS**, QUINTUS LUTATIUS, d. 87 B.C.; consul of Rome with Calus Marius. Catulus was beaten by the invading Cimbri and driven across the Po, but Marius came to his aid, and the barbarians were defeated at Vercellæ in July, 101 B.C. In the civil war Catulus supported Sulla and was proscribed. Preferring death to capture, he suffocated himself over burning charcoal.

**CATULUS**, QUINTUS LUTATIUS, son of the consul; made consul in 78, and censor in 65, B.C. He put down a rebellion incited by Lepidus after the death of Sulla, and assisted Cicero in the suppression of Catiline's conspiracy.

**CAUB**, a t. of Nassau, n. Germany, on the right bank of the Rhine, 21 m. w.n.w. of Wiesbaden. It is noteworthy as the place where Blücher crossed the Rhine with his army, Jan. 1, 1814; and also as the place where, till 1866, toll was levied by the duke of Nassau—the only ruler who kept up this feudal privilege—from vessels navigating the Rhine. C. has underground slate-quarries; and opposite, on an island in the river, where Louis le Débonnaire died, 840, is a castle called the Pfalz, built in 1826, and which is said to have been resorted to for safety by the countesses Palatine during their confinement. C. is threatened with destruction by the disintegration of the mountains behind, and in Mar. 1876 a destructive landslip took place. Pop. about 3000.

**CAUCA**, a river of the United States of Colombia, in South America, which, after flowing 500 m. to the n.e., joins the Magdalena on the w., 150 m. from the Caribbean sea. It gives name to the department of Cauca.

**CAUCA**, one of the United States of Colombia, occupying the whole w. coast of the Caribbean sea to Ecuador, including the chain of the Andes and the valley of the Rio Cauca; 257,462 sq. m. (more than half of the republic); pop. '81, 621,000; later est., 641,000. The region is well cultivated, producing cereals, sugar, tobacco, coffee, cocoa, cotton, etc., and vast herds of horned cattle and mules. The capital is Popayan.

**CAUCASIAN VARIETY OF MANKIND**, an ethnological division adopted by Blumenbach, which included all the inhabitants, ancient and modern, of Europe (except the Finns); in Asia, the Hindus (of high class at least), Persians, Assyrians, Arabians, Jews, Phœnicians, inhabitants of Asia Minor and of the Caucasus, etc.; and in Africa, the Egyptians, Abyssinians, and Moors. What Blumenbach had called Caucasians, Dr. Prichard, who may be said to have laid the real foundation of ethnology, makes to consist of two independent groups or varieties, grounding on a radical difference of language. One of these is the Syro-Arabian or Shemitic (q.v.) race, and the other the Indo-European or Aryan (q.v.) race. The inhabitants of the Caucasus, so long held to be types of the European variety, are now by some excluded from it altogether, and classed with the sallow flat-faced Mongols, to which it is considered the nature of their language and other facts ally them more closely than the symmetry of their shape and complexion do to the European variety. The narrow basis upon which the theory of the Caucasian type was first formed is thus stated by Dr. Latham: "Blumenbach had a solitary Georgian skull; and that skull was the finest in his collection—that of a Greek being the next. Hence it was taken as the type of the skull of the more organized divisions of our species. More than this, it gave its name to the type, and introduced the term *Caucasian*. Never has a single head done more harm to science than was done in the way of posthumous mischief by the head of this well-shaped female from Georgia." See **ETHNOLOGY**.

**CAUCASUS**, a mountain range of great geographical and ethnographical importance, occupying the isthmus between the Black sea and the Caspian, its general direction being from w.n.w. to e.s.e.—from the peninsula of Taman on the Black sea, in lat. 45° 10' n., long. 36° 45' e., to the peninsula of Apscheron on the Caspian, in lat. 40° 20' n., long. 60° 20' e.—a length of about 750 miles. The breadth, including the secondary ranges and spurs, may be stated at about 150 m., but the breadth of the higher C. is much less, not much exceeding 60 or 70 miles. This range, formerly belonging entirely to Asia, now forms part of the boundary-line between Europe and Asia. The higher and central part of the range is formed of parallel chains, not separated by deep and wide valleys, but

remarkably connected by elevated plateaus, which are traversed by narrow fissures of extreme depth. The highest peaks are in the most central ridge or chain—Mt. Elburz attaining an elevation of 18,000 ft. above the sea, while Mt. Kasbeck reaches a height of more than 16,000 ft., and several others rise above the line of perpetual snow, here between 10,000 and 11,000 ft. high; but the whole amount of perpetual snow is not great, nor are the glaciers very large or numerous. This central chain is formed of trachyte. The secondary parallel chains are, on the inner side, mostly formed of argillaceous slate and plutonic rocks; on the outer side of limestone. The spurs and outlying mountains or hills are of less extent and importance than those of almost any other mountain-range of similar magnitude, subsiding as they do until they are only about 200 ft. high along the shores of the Black sea. Some parts are entirely destitute of wood, but other parts are very densely wooded, and the secondary ranges, near the Black sea, exhibit most magnificent forests of oak, beech, ash, maple, and walnut; grain is cultivated in some parts to a height of 8,000 ft., while, in the lower valleys, rice, tobacco, cotton, indigo, etc., are produced. As might be expected from the geographical situation of the C., the climate, though it is generally healthy, is very different on the northern and southern sides, the vine growing wild in great abundance on the s., which is not the case on the north. The s. declivity of the mountains, towards Georgia, presents much exceedingly beautiful and romantic scenery.

There are no active volcanoes in Mt. C., but every evidence of volcanic action. There are mud-volcanoes at each end of the range, and there are also famous naphtha springs in the peninsula of Apsheron. See BAKU. Mineral springs also occur in many places. The bison, or aurochs, is found in the mountains; in the forests are many fur-bearing animals; and game abounds. Bears, wolves, and jackals are among the carnivorous animals. Lead, iron, sulphur, coal, and copper are found.

The waters of the C. flow into four principal rivers—the Kuban, and the Rion or Faz (the *Phasis* of the ancients), which flow into the Black sea; and the Kur and the Terek, which flow into the Caspian. The Russians have carried a military road, with great labor and danger, through a valley somewhat wider than most of the Caucasian valleys, between the sources of the Kuban and the Terek. This road passes over a height of about 8,000 ft., and is protected by many forts, but is exposed to other dangers besides those which arise from the hostility of the mountain tribes. The only other road is by the pass of Derbend, near the Caspian sea.

The resistance which the Caucasian tribes, for more than half a century, offered to the arms of Russia, attracted to them the attention of the world. But with the capture (1859) of the prophet-chief of the Lesghians—Schamyl, the most active and determined of the foes of Russia, who for a quarter of a century withstood and harassed the armies sent against him—the power of the Caucasians was greatly shattered; and after his death in 1871 the Russians regarded the territory as virtually subjugated. A large number of the Circassians elected to migrate to Turkish territory, where they were welcomed. The general name Circassians (q.v.) is often, but not very correctly, applied to the tribes which inhabit the Caucasus, and whose whole number is not above 1,800,000 or 1,500,000. From the situation of Mount C., there have gathered together in it tribes belonging to a greater number of distinct races than can perhaps be found within the same space anywhere upon the earth. There are more than 100 different languages or dialects spoken; the Turkish-Tartar language, however, serving for a general medium of communication. The different tribes inhabiting the C., long believed to be the purest type of the Indo-European family, are now considered not to belong to it at all, but to have more affinity with the Mongolian races. See CAUCASIAN VARIETY OF MANKIND. The principal tribes are the Tsherkesses or Circassians, Ossetes, Lesghians, Abchassians, Georgians, Suans, and Tchetches. The Georgians and Ossetes are at least nominally Christians; the Lesghians are fanatical Mohammedans. The Byzantine emperors and kings of Georgia planted Christian churches throughout this region, and many ruins of them remain, some of which are very beautiful. But the present Christianity of the nominally Christian tribes is more akin to heathenism than to true Christianity. In character, they are distinguished by their valor and love of freedom, but also by cruelty and treachery. They carry on a little agriculture, but live more by the care of their flocks, and by hunting.—The Russian lieutenantcy of the C., lying on both sides of the mountain range, has an area of 172,170 sq.m., and a pop. (1887) of 7,458,151. For type of people, see *illus.*, ETHNOLOGY, vol. V.

**CAUCASUS, INDIAN.** See HINDU-KUSH.

**CAUCHON** JOSEPH EDWARD, b. 1816; a Canadian journalist and legislator; was in the colonial or Dominion parliament, 1844-77. From 1867 to 1872 he was speaker of the senate. He established the *Quebec Journal*, 1842; was lieut.-gov., Manitoba, 1877-82; and d. in 1885.

**CAUCHY**, AUGUSTIN LOUIS, 1789-1857; a French mathematician; a member of the academy in 1816, and professor of mathematics in the polytechnic school. His reputation rests chiefly upon his residuary and imaginary calculus. In politics he was a firm legitimist, steadily refusing to take the oaths of allegiance from time to time proffered, and on that account resigning his chair of mathematics in the new university of Paris in 1852. He published several valuable works on the calculus, etc.

**CAUOUB**, a meeting, private or public, of citizens to select candidates for office; or of members of a legislative body for a similar purpose. Recently the meaning of the term has been extended to almost any conference previous to final action. Thus the people may hold a C. to ask or instruct their representative to support one or another measure; or the members of a party in congress, legislature, common council, or town-meeting may hold a C. to determine their course upon any subject. Legitimately, therefore, the term C. means a preliminary or preparatory meeting to arrange methods for some designated end. Much effort and ingenuity have been spent in trying to settle the origin of the term, but the most probable theory is that it came from Boston about the middle of the last century, and originally meant "the calkers' meeting," that is, the private gathering of the ship-calkers. The term was applied almost indiscriminately to meetings in the period preceding the revolution, and when the federal government was instituted it was accepted as the official term for what are now called "nominating conventions." Candidates for president of the United States were uniformly selected by a C. of the members of congress of the several parties, from 1789 to 1828. In the election of 1824, the regular democratic C. candidate, William H. Crawford, ran behind both Jackson and Adams, and but for some jugglery in New York would have run even behind Clay and come out the lowest of the four. This result ended the congressional C. system of presidential elections, and since that time candidates have been nominated by national conventions or political parties. Soon afterwards state conventions supplanted the legislative C. for the nomination of state officers, and now the C. is practically confined to the meetings of partisans in legislative bodies to decide upon a policy, or to select candidates for presiding and other officers of the particular body, or (by joint C. of senators and members of assembly) to settle upon nominees for U. S. senators. On the origin of the word see *Notes and Queries* (1885).

**CAUDEBEC-LÈS-ELLEUF**, a t. of France, in the department of Seine-Inférieure, 12 m. s. of Rouen. It has manufactures of cloth, and a pop. of (1891) 10,434. — **CAUDEBEC** is also the name of a t. in the same department, situated on the right bank of the Seine, 26 m. e. of Havre. It is one of the prettiest and most picturesque little towns on the Seine, with its old wooden houses and elm-shaded quays. It has a fine Gothic church of the 15th c., and manufactures of cotton, sail-cloth, leather, and soap. Formerly the capital of the Pays de Caux, C. was strongly fortified; and in 1419, so obstinate was its resistance, that it took the great English gen., Talbot, 6 months to capture it. Pop. '91, 2309.

**CAUDE'TÉ**, a t. of Murcia, Spain, 50 m. e.s.e. of Albacete. The inhabitants, 6,500 in number, are chiefly engaged in agricultural pursuits. C. is also the name of a small place in New Castile, a few miles from Ternel, where there are some of the largest bone-deposits, fossilized and unfossilized, in Europe.

**CAUDINE FORKS** (*Furcula Caudina*), two high, narrow, and wooded mountain gorges near the town of Caudium, in ancient Samnium, on the boundary towards Campania. These gorges are celebrated on account of the defeat here suffered by the Romans in the second Samnite war (321 B.C.). Four Roman legions commanded by the two consuls Titus Veturius and Spurius Postumius, after marching through a narrow pass, found themselves locked in a spacious valley, surrounded on all sides by lofty mountains, with no way out save that by which they entered, and another pass on the opposite side. Attempting to defile through the latter, they found it blocked up with trees and stones, and commanded by the Samnites, who had also in the mean time made themselves masters of the other pass. Consequently, the four legions were compelled to encamp in the valley. After some days, famine compelled them to surrender unconditionally. The Samnite gen., Caius Pontius, according to old custom, compelled the Romans to pass under the yoke, and then permitted them to march back. This submission was regarded as too ignominious for Rome, and consequently the two consuls and the other commanders were delivered again into the hands of the Samnites, who, however refused to have them.

**CAUDLE LECTURES**. Lectures like those delivered by Mrs. Caudle, the nagging wife in Douglas Jerrold's (q. v.) famous work, *Mrs. Caudle's Curtain Lectures*.

**CAUGHNAWA'GA**, a village in Laprairie co., Canada, 10 m. w. of Montreal, on the St. Lawrence, at the head of the Lachine rapids. It is inhabited exclusively by Indians, remnants of the once powerful Iroquois. Pop. '91, about 1700.

**CAUL** is a thin membrane encompassing the heads of some children when born, and is mentioned here on account of the extraordinary superstitions connected with it from very early ages down to the present day. It was the popular belief that children so born would turn out very fortunate, and that the C. brought fortune to those purchasing it. This superstition was so common in the primitive church, that St. Chrysostom felt it his duty to inveigh against it in many of his homilies. In later times, midwives sold the C. to advocates at enormous prices, "as an especial means of making them eloquent," and to seamen, as an infallible preservative against drowning. It was also supposed that the health of the person born with it could be told by the C., which, if firm and



crisp, betokened health, but if relaxed and flaccid, sickness or death. During last century, it was common to find advertisements in the newspapers of caulks to be sold—from £10 to £30 being the prices asked for them. So recently as 8th May, 1848, there was an advertisement in the *London Times* of a C. to be sold, which "was with its late owner thirty years in all the perils of a seaman's life, and the owner died at last at the place of his birth." The price asked was six guineas. Sir John Offley, of Madeley manor, Staffordshire, by his will, proved at Doctors' Commons 1658, devised a C. set in jewels, which had covered him when he was born, to his daughter, thereafter to her son, and then to his own heirs-male. The C. was not to be concealed or sold out of the family. See Brand's *Popular Antiquities*, vol. iii.; *Notes and Queries*, 1st series, vol. vii.

**CAULAINCOURT**, ARMAND AUGUSTIN LOUIS DE, duke of Vicenza, a statesman of the French empire, was b. at Caulaincourt, a village in the department of Somme, Dec. 9, 1772. He entered the army at the age of fifteen, rapidly attained promotion, and, as col. of a regiment of carbiniers, distinguished himself in the campaign of 1800. He was made a gen. of division in 1805, and shortly after created duke of Vicenza. In 1807, he was appointed ambassador at St. Petersburg, where he soon gained the confidence of the czar, who often made use of his advice. Disputes having arisen between Alexander and Napoleon, C. endeavored to restore amity and prevent war; but his proposals being rejected, he, in 1811, asked permission to resign his post, and received an appointment in the army of Spain. During the events of 1818, he was frequently employed as plenipotentiary in diplomatic affairs. In Nov. of 1818, he was made minister for foreign affairs, and in this capacity attended the congress at Chatillon, Jan., 1814. When Napoleon abdicated, C. endeavored to make use of his influence with Alexander to obtain the most favorable conditions for the fallen emperor, and, chiefly through his intervention, the island of Elba was ceded to Napoleon. During the hundred days, C. resumed office as minister of foreign affairs, and was made a peer. On the second restoration, he retired into private life. He died in Paris, Feb. 19, 1827. —His brother, AUGUST JEAN GABRIEL, count of Caulaincourt, b. 1777, served with distinction in all the campaigns from 1792 to 1812, when he fell in battle.

**CAULIER**, MADELEINE, a peasant girl of France who aspired to the military fame of the maid of Orleans. At the siege of Lille, in Sept., 1708, she conveyed into the city an important order to the officer in command, for which the duke of Burgundy offered her a large reward. This she declined, but received permission to raise a company of dragoons. She was killed in the battle of Denain, July 24, 1712, when Marshal Villiers defeated the imperialists.

**CAULIFLOWER**, a variety of the common kale or cabbage, affording one of the most esteemed delicacies of the table. It was cultivated as a culinary vegetable by the Greeks and Romans. Its culture was, however, little attended to in England till the end of the 17th c.; but after that time it rapidly increased, and prior to the French revolution, C. formed an article of export from England to Holland, whilst English C. seed is still preferred on the continent. The C. is entirely the product of cultivation. The leaves are not in this, as in other varieties of the same species generally, the part used, nor are they so delicate and fit for use as those of most of the others, but the flower-buds and their stalks, or, properly speaking, the inflorescence of the plant deformed by cultivation, and forming a head or compact mass generally of a white color. There are many subvarieties, but all of them are rather more tender than the ordinary forms of the species, and in Britain generally require more or less protection during winter, whilst the seed is sown on hotbeds, that the plants may be ready for planting out in spring. Later sowings are made in the open ground. The C. requires a moist rich loamy soil, with abundance of manure, and above all, very careful cultivation, which is directed to the object of having the heads not merely large, but as compact of possible. Great care is bestowed on the selection of proper plants for seed. In Scotland, C. plants almost always require the protection of the frame during winter. C. may be preserved for some time fit for use by pulling the plant up by the roots, and hanging it in a cold and dry place.—**BROCCOLI** (q.v.) may be regarded as another kind of cauliflower.

**CAULKING** is the operation of driving oakum or untwisted rope into the seams of a ship, to render them water-tight. The quantity thus driven in depends on the thickness of the planking; it varies from 1 to 13 double threads of oakum, with 1 or 2 single threads of spun-yarn. The caulker first *raims* or *reems* the seam—that is, drives a caulking iron into it, to widen the seam as much as possible, and close any rents or fissures in the wood; he then drives in a little spun-yarn or white oakum with a mallet and a kind of chisel, and afterwards a much larger quantity of black or coarse oakum. The fibers are driven in until they form a densely hard mass, which not only keeps out water, but strengthens the planking. The seam is finally coated with hot pitch or resin.

**CAULONIA**, an ancient Greek city in Italy near the gulf of Syllacium. It was a town of importance five centuries before Christ. In 389 B.C. it was captured by Dionysius the elder who removed its people to Syracuse. Porphyry asserts that Pythagoras sought refuge in Caulonia after his expulsion from Crotona.

**CAULOPTERIS**, a generic name for the stems of fossil tree-ferns found in the carboniferous and triassic measures. They are hollow, and covered with the markings similar to the leaf-scars on recent tree-ferns. Twelve species have been described.

**CAUS**, or **CAULX**, SALOMON DE, 1576-1626; a French engineer and physicist who resided in England and in Heidelberg, and later in Paris. Little was known of him until Arago exhumed his works, from which he considered him to have been the real inventor of the steam engine, for in one of these works he gave the plan of an apparatus for raising water by the power of steam. Some critics believe that it was from Caus that the marquis of Worcester got the idea, printed in his *Century of Inventions* in 1633, of the "exact and true deposition of the most stupendous water-commanding engine, invented by the right honorable Edward Somerset, lord marquis of Worcester."

**CAUSE**. The words "Cause," "Causality," and "Causation," although familiar and intelligible in ordinary speech, have given rise to some of the most subtle questions in philosophy and theology. We shall here advert briefly to the chief meanings of these terms, and in so doing, we shall indicate the disputes that have arisen in connection with them.

In common language, we are accustomed to describe as the C. of an event, the one event immediately preceding it, and but for which it would not have happened. A man slips his foot on a ladder, falls, and is killed: we give the slipping of the foot as the C. of the fatality. A legislative assembly decides a question of great moment by the casting vote of the president, who is then not unfrequently spoken of as the C. of all the good or evil that followed on the decision. Now, a slight examination shows that this mode of speaking is defective, as not expressing the whole fact, or, in other words, presumes a great deal that is not stated. In the supposed death from a fall, there are many conditions necessary to the result besides the slipping of the foot: the weight of the body, the height of the position, the hardness of the ground, the fragility of the human frame, all enter into the C. strictly represented; but for practical purposes, we leave out of account all those elements that are not at the moment under our control, and allude to the one that is so. And when we speak of the decision of an assembly being the effect of the president's vote, we mean that his share in the responsibility is peculiarly great, or that, in order to turn the vote in one way, all that is necessary is to secure his individual opinion. If we do not enumerate all the conditions of the event, it is because some of them will, in most cases, be understood without being expressed, or because, for the purpose in view, they may without detriment be overlooked.

When, however, we aim at strict accuracy, as in the investigations of science, we must not be content with singling out the one turning event, but must enumerate everything that is necessary to the result. A *scientific C.* is the full assemblage of *conditions*, falling any one of which, the effect would not happen. In a full explanation of the phenomenon of the tides, we must enumerate all the circumstances connected with their production—the attraction of the sun and moon, the motions of the earth and the moon in their orbits, the globular form and rotation of the earth, the liquidity of the sea, the mode of distribution of the sea over the earth—every one of which facts is an essential in the full causation. The effect cannot be adequately accounted for without adverting to every one of those conditions, and it is therefore the sum-total of them that is rightly described as the C. of the tides. Taking this complete view of causation, it is found that every event that happens is the sequel to some previous event, in whose absence it would not have been, but which being present it is sure to occur. Between the phenomena existing at any instant, and the phenomena existing at the succeeding instant, there is an invariable order of succession; to certain facts, certain facts always do, and, as we believe, will continue to succeed. The invariable antecedent is termed the C.; the invariable consequent, the effect. What is termed the *law of universal causation*, consists in this, "that every consequent is connected in the manner now described with some particular antecedent, or set of antecedents."—Mill's *Logic*, book iii. chap. 5.

The physical philosopher—the chemist or physiologist—trusts to the uniformity with which the same C. yields the same effect; and if he can find out the true succession in one instance, he is satisfied that the same succession will always hold. In the physical sciences, therefore, there is no dispute as to the law of causation itself; the controversies on that head occur only in *metaphysics*. It is made a serious problem by mental philosophers, and also by theologians, to determine how we come by the irresistible belief that we are said to possess, that every event has and must have a cause. There are many answers to this question: eight are enumerated by sir William Hamilton (*Discussions on Philosophy*, p. 611, 2d edit.). It is only necessary, however, to advert to the two radically opposite points of view from which the subject is now surveyed.

The one view is, that we have an instinct or *intuition* of the mind by which we are compelled to recognize this law, so that to us it is a necessary truth, which we cannot escape from if we would. Our experience of the outer world, doubtless, shows us that things follow one another in an orderly and uniform manner, that the stone that sinks in water to-day does not float to-morrow, but no experience could give us the sense of commanding necessity that we have of the law of C. and effect. "Causation is not the mere invariable association of antecedent and consequent; we *feel* that it implies

something more than this." The philosophers who maintain this side give forth two different affirmations; the *one*, that we actually possess an intuitive belief of necessary causation; the *other*, that our possession of the belief is a sufficient proof that the law actually pervades the universe. Experience operates to confirm us in those instinctive tendencies, but no amount of experience would have been able to create them.

The latest modification of the theory that ascribes our belief in causation to an intuition of the mind, is the doctrine promulgated by sir W. Hamilton, to the effect that "we are unable to think that the quantity of existence, of which the universe is the conceived sum, can be either amplified or diminished. We are able to conceive, indeed, the creation of a world; this, in fact, as easily as the creation of an atom. But what is our thought of creation? It is not a thought of the mere springing of nothing into something. On the contrary, creation is conceived, and is by us conceivable, only as the evolution of existence from possibility into actuality, by the fiat of the Deity. And what is true of our concept of creation, holds of our concept of annihilation. We can think no real annihilation—no absolute sinking of something into nothing."—*Discussions*, p. 619. Thus, every effect must have a C., and every C. must have its effect, because, if it were not so, there would be either a pure creation or a pure annihilation, neither of which, according to sir W. Hamilton, is thinkable or conceivable by the human mind. This doctrine, however, has not found acceptance even by those who, if not actual disciples of the author, are most disposed to receive his philosophy generally, as may be seen by referring to Prof. Fraser's *Essays in Philosophy*, p. 170; M'Coish *On the Divine Government*, p. 529, 4th edition; and Mansel, art. metaphysics, *Encyclopædia Britannica*. So far from the creation or annihilation of matter or force being inconceivable, it may be said with truth that until the end of last century it was not known as a fact that the materials of the globe are absolutely indestructible. The effects of combustion and evaporation could hardly suggest anything else than the annihilation of a certain portion of material. Combustion merely transformed the material consumed into other shapes, nothing being absolutely lost. So much for ponderable matter. As regards force, or moving power, the demonstration that this is never absolutely lost, even on the many occasions when it is so to all appearance, is a still later result of laborious scientific inquiries, being, in fact, one of the conclusions arrived at within the last few years. See FORCE. To represent, therefore, one of the latest achievements of experimental science as a primitive intuition of the human mind, is to violate, in the strongest manner, our sense of propriety and consistency.

As opposed to the intuitional doctrine of causation, we have a variety of views by Hume, Dr. Thomas Brown, and others, which need not be specified in detail. One may be given as an example. It has been seen that there are two affirmations in the theory just discussed; that the mind possesses an intuitive belief of causation, and that the possession of this belief is evidence of the existence of the law. Now, one or both of these affirmations may be denied; and the *denial* of either, by even a small minority of the human race, is held to be fatal to the theory, because *unanimity* is essential to the establishment of a universal instinct. Now, many men may possess an instinctive belief in the necessity of a cause to all effects, and of an effect to all causes; some, it is affirmed, do not; it cannot, therefore, be a universal or essential part of human nature.

In like manner, the second affirmation—namely, that the possession of an instinctive belief is a proof of the truth of the thing believed—is denied, on the ground that our instincts often dispose us to believe things that experience shows to be untrue. We have a strong natural tendency to believe in the universality and continuance of the exact order of things that we are ourselves born into, and are only put right by seeing the contrary. "A mere disposition to believe, even if supposed instinctive, is no guarantee for the truth of the thing believed. If, indeed, the belief ever amounted to an irresistible necessity, there would be then no *use* in appealing from it, because there would be no possibility of altering it. But even then the truth of the belief would not follow: it would only follow that mankind were under a permanent necessity of believing what might possibly not be true; just as they were under a temporary necessity—quite as irresistible while it lasted—of believing that the heavens moved, and the earth stood still. But, in fact, there is no such permanent necessity. Many of the propositions of which this is most confidently stated, great numbers of human beings have disbelieved. The things which it has been supposed that nobody could possibly help believing, are innumerable; but no two generations would make out the same catalogue of them."—*Mill's Logic*, book iii. chap. 21. Mr. Mill and others hold that the proof of the law of causation rests exclusively on the uniform and growing experience of the human race. This, however, is not inconsistent with our possessing the natural instinct above alluded to, by which we are led to suppose that what is will continue, and what has been will be repeated; an instinct that *coincides*, to a certain extent, with the law of C. and effect, and is therefore a predisposition on our part to accept what experience teaches on this head. It is only maintained that the instinct is of itself *no proof*, although useful in so far as it prepares us for what there is real evidence for believing. By yielding to the instinct in its crudest shape, the inhabitant of the tropics scouts the idea that water can ever be solid; the African would deny the existence of white men; and even an intelligent European could not be persuaded that any metal would float. Experience must correct the instinctive tend-

encies, otherwise no reliance can ever be placed upon them; by which we acknowledge it as the sole test of truth, while intuitive dispositions are no test whatever.

Even those who maintain the instinctive necessity of the conviction we are discussing, admit two great exceptions—viz., the existence of a FIRST C., itself uncaused, and the liberty of the will, or the exemption of human actions from the rule that applies so strictly to physical nature.

It is further contested between the two opposite schools of philosophy, whether or not MIND be the sole ultimate C. of all phenomena, as it is the C. most familiar to us—namely, the source of our voluntary exertions. On one side, it is affirmed to be "inconceivable that dead force could continue unsupported for a moment beyond its creation. We cannot even conceive of change or phenomena without the energy of a mind." "The word action has no real significance, except when applied to the doings of an intelligent agent." "Phenomena may have the semblance of being produced by physical causes, but they are in reality produced by the immediate agency of a mind; if they do not proceed from the human, they are the result of the divine will." To this it is replied, that we are here taking for granted that every kind of power is analogous to that which we happen to be first acquainted with; but it is a pure assumption without proof or relevance, to suppose that all modes of energy must conform to this one type. Mill, book iii. chap. 5. It is further pointed out that even in ourselves, pure mind, or mind acting by itself, is not known to be an efficient C.; it must be mind together with body. The laborer cannot sustain a day's toil merely because of his *wish* to do so; he must be fed, and rested, and have all his bodily organs in good condition, in order to do his work.

The subject of causation was very particularly studied by Aristotle. He enumerated four different kinds of causes, which have ever since had a place in philosophy. These are the *material*, the *formal*, the *efficient*, and the *final*. The first, or *material*, is what anything is made of; brass or marble is the material C. of a statue. The *formal* is the form, type, or pattern according to which anything is made; the drawings of the architect would be the formal C. of a house. The *efficient* is the power acting to produce the work, the manual energy and skill of the workmen, or the mechanical prime mover, whether that be human or any other. The *final* C. is the end or motive on whose account the work is produced, the subsistence, profit, or pleasure of the workman. Aristotle mentions the case of a physician curing himself, as exemplifying all the causes in one and the same subject. It is obvious that these are what we should now term the aggregate of *conditions* necessary to the production of any work of man; it being essential that there should be a motive for the work (final), a material to operate upon (material), a plan to proceed by (formal), and an exertion of energy to do what is wanted (efficient). When nature is viewed as the result of a creative mind, these causes are considered as inhering in the Divine contriver.

**CAUSE CÉLÈBRE**, a convenient French term for an especially interesting and important legal trial, criminal or civil, such as the Douglas case (1769-71), the Dred Scott case in the United States as to the possession of a negro (1856), the famous Tichborne case in England (1871-74), and that of the Parnell inquiry (1889). There is a French collection of *Causes Célèbres et Intéressantes* (22 vols. 1787-45), by Gayot de Pitaval, with later continuations.

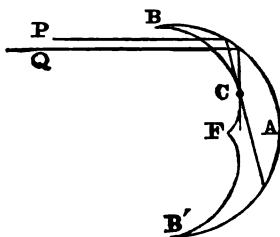
**CAUSERIE**. (French, chat, gossip.) This term was first used in a literary way by Sainte-Beuve (q. v.) in his famous *Causeries du Lundi*, and signifies a short, familiar article on any subject, usually published in magazines or newspapers. As the writer is generally well known, its style is convenient where readers are interested in the author as well as in what he says. It is less formal than the generally accepted style of essay.

**CAUSTIC** (Gr. burning), in medicine and in chemistry, is the term applied to such substances as exert a corroding or disintegrating action on the skin and flesh. *Lunar C.* is nitrate of silver, and *common C.* is potash. When used as a C. in medicine, the substance is fused and cast into molds, which yield the C. in small sticks the thickness of an ordinary lead pencil, or rather less.—*C.* is also used in chemistry in an adjective sense—thus C. lime, or pure lime, CaO, as distinguished from mild lime, or the carbonate of lime, CaCO<sub>3</sub>, C. magnesia, MgO, and mild magnesia, MgCO<sub>3</sub>, etc.

**CAUSTIC, CATACAUSTIC, and DIACAUSTIC**. In optics, C. is the name given to the curved line formed by the ultimate intersections of a system of rays reflected or refracted from a reflecting or refracting surface, when the reflection or refraction is inaccurate. When the C. curve is formed by reflection, it is called the catacaustic—sometimes simply the C.; when formed by refraction, it is called the diacaustic curve. In mathematical language, a curve formed by the ultimate intersections of a system of lines drawn according to a given law is called the *envelope*, and is such that the lines are all tangents to it. As in a system of rays reflected or refracted by the same surface *all* follow the same law, it follows that the C. is the envelope of reflected or refracted rays.

An example of the catacaustic is given in the annexed figure for the case of rays falling directly on a concave spherical mirror, BAB', from a point so distant as to be practically parallel. The curve may be said to be made up of an infinite number of points, such as C, where two very near rays, such as P, Q, intersect after reflection. This catacaustic is an epicycloid. The curve varies, of course, with the nature of the

reflecting surface. In the case represented in the figure, the cusp point is at F, the principal focus. No such simple example can be given of the diacaustic curve as that above given of the catacaustic. It is only in the simplest cases that the curve takes a recognizable form. In the case of refraction at a plane surface, it is shown that the diacaustic curve is the evolute either of the hyperbola or ellipse, according as the refractive index of the medium is greater or less than unity.



The reader may see a catacaustic on the surface of tea in a tea-cup about half full, by holding the circular rim to the sun's light. The space within the caustic curve is all brighter than that without, as it clearly should be, as *all* the light reflected affects that space, while no point without the curve is affected by more than the light reflected from half of the surface.

**CAUTERETS**, a watering place in Hautes-Pyrénées, France, 26 m. from Tarbes. It is in a basin 3254 ft. above tide, and is noted for its many hot sulphur springs, ranging from 102° to 140° F. Pop. 1300.

**CAUTERY**. See BLEEDING, and MOXA.

**CAUVERIPURAM**, a t. of the district of Coimbatore, in the presidency of Madras, on the right bank of the Cauvery, in lat. 11° 54' n., and long. 77° 48' east. It takes its name from the neighboring gorge of 80 m. in length through the eastern Ghats, along which the Cauvery finds a passage. Pop. of C. (or *Kaveripuram*), 7,000.

**CAUVERY**, or **KAVERI**, a river in the s. of Hindustan, rising in Curg, and flowing through Mysore and Madras, with a course of 472 m., into the bay of Bengal by various mouths. Its delta, with a coast of 80 m., and a depth of 70, lies almost wholly in the district of Tanjore. The C. is peculiarly available for irrigation. During the rainy season, the stream is navigable for small craft.

**CAVA**, a t. of Italy, in the province of Salerno, 3½ m. n.w. of the town of Salerno. It is a flourishing place, with manufactures of silk, cotton, linen, and pottery. About a mile from C. is the celebrated Benedictine monastery of the Trinity, with its magnificent archives, containing numerous MSS. and parchment rolls. Its library, at one time also rich in MSS. and rare printed books, has been dispersed. Pop. of commune, 21,000.

**CAVAGNARI**, Sir **LOUIS**, was born in France in 1841, educated at Christ's Hospital, London, and in 1857 became a British subject by naturalization. He had seen twenty-one years' military and political service in India when he was murdered on September 8, 1879, at Kabul. See **AFGHANISTAN**.

**CAVAIGNAC**, **ELÉONORE LOUIS GODEFROY**, 1801-45; a journalist of Paris, son of Jean Baptiste. He was an opponent of Louis Philippe and one of the prominent founders of the "Société des Amis du Peuple," and of the "Société des Droits de l'Homme." He was often arrested and sometimes imprisoned, but escaped in 1835 and went to Belgium. In 1841, he returned to Paris and became one of the editors of the *Réforme*, the ablest of the opposition newspapers.

**CAVAIGNAC**, **LOUIS EUGÈNE**, was b. in Paris, 1802, and was educated in the Polytechnic school, and the *École d'Application* at Metz. He first served in the Morea, and afterwards in Africa (whither he was sent in 1832 into a kind of honorable exile, in consequence of a too free expression of opinion in favor of republican institutions), where he acquired great distinction by his energy, coolness, and intrepidity. He was made *chef de bataillon* in 1837, and rose to the rank of *brigade-gen.* in 1844. In 1848, he was appointed governor-general of Algeria, but in view of the impending revolutionary dangers, was called to Paris, he having also been elected as a delegate to the national assembly by the two departments of Lot and Seine. In the insurrection of June which followed, C., as minister of war, had a most difficult task to play, and he displayed, during the four days and nights of the contest, remarkable presence of mind, firmness, and activity. His plan of action appeared strange and almost traitorous at the time. In opposition to the wishes of the national assembly, who desired that the troops should be dispersed over Paris, he divided his men into three separate bodies, which had to clear their several routes from obstacles in order to effect a reunion, streets and even quarters of the city being left for some time without military protection. Regarding the outbreak more as the beginning of a civil war than a mere insurrection, he, in fact, met the insurgents in true order of battle. His operations were successful, and his clemency was as remarkable as his generalship. When he had the power of assuming the dictatorship, he resigned it into the hands of the national assembly, which appointed him president of the council. As a candidate for the presidency of the republic, when Louis Napoleon was elected, he received about a million and a half of votes. On the *coup d'état* of Dec., 1851, C. was arrested, but released after a short detention; and though he consistently refused to give in his adhesion to the empire, he was permitted to reside in France without molestation. He died very suddenly of heart disease in Oct., 1857, at his country-house near Tours, and was buried in the cemetery of Montmartre, Paris, in presence of many thousand spectators, including several republican leaders. In debates, C. was remarkably unlike his countrymen, being not voluble and declamatory, but sober, clear, and moderate.

**CAVAILLON**, a t. and important railway junction in Vaucluse, France, 18 m. s.e. of Avignon. It is a poorly built and dirty place, but has a fine town-house, an old church of the 12th c., and the remains of a triumphal arch of about the time of Constantine; other relics of the Roman period are found in the neighborhood. There is considerable trade in dried fruits, madder, and the agricultural productions of the fertile region around. Pop., '91, 9077.

**CAVALCANTI**, GUIDO, abt. 1250-1300; an Italian poet and philosopher, son of the philosopher whom Dante pictured in torment among the Epicureans and Atheists—but himself a friend of the great poet. By marriage C. became the head of the Ghibellines, and after some years was banished with the other leaders, and died in exile. His poems are chiefly in honor of a French lady, by him called Mandetta. He also wrote on philosophy and oratory. See Bartoli's *Storia della Letteratura italiana*, vol. IV. (1861.)

**CAVALIER**, in fortification, is a defense-work constructed on the *terre-plein* or level ground of a bastion. It rises to a height varying from 8 to 12 ft. above the rampart, and has a parapet about 6 ft. high. Its uses are to command any rising ground.

**CAVALIER** (Fr. *chevalier*; Ital. *cavaliere*; Span. *caballero*, probably from the Latin *caballus*, a horse) originally meant any horse-soldier, but in English history is the name given to the party which adhered to King Charles I., in opposition to the round-heads (q. v.), or friends of the parliament.

**CAVALIER**, a county in northeastern North Dakota, formed in 1873 from part of Pembina and organized in 1884; 1512 sq. m.; pop. '90, 6471. Co. seat, Langdon.

**CAVALIER**, JEAN, about 1680-1740; a native of lower Languedoc, in southern France; the famous chief of the Camisards (who in some particulars seem to have been the precursors of the English and American shakers). He was a peasant's son, and was employed in sheep-keeping, afterwards as apprentice to a baker, and within that period trained by a pious Protestant mother. He was driven from his native place by the pitiless persecution of Protestants that followed upon the revocation of the edict of Nantes, and took refuge in Geneva. The murderous dragonnades of Louis XIV. drove the Protestants of the Cevennes at last to revolt, and C., inspired with the hope of being their deliverer, returned in 1702 to his own country, where he became one of the chosen leaders of the insurrection, which broke out in July of that year. It was Roland who was put in chief command, but C. soon rose to be his equal, and, though untrained in arms, he displayed not only fiery courage, but extraordinary military skill. Although these "children of God," as the insurgents were called, numbered at the most not more than 8,000 men-at-arms, they coped successfully again and again with the far greater forces of the king, and were never entirely conquered. After several conflicts, C. changed the seat of the war to the Vivarais; and Feb. 10, 1708, defeated the royal troops at Ardeche; but a few days later was himself defeated, but, recovering himself, was successful in subsequent encounters; invaded the region of the plains and even threatened Nismes. In April, 1704, he was defeated by Marshal Montrevel, but retreated with two-thirds of his forces. Marshal Villiers, being sent against him, proposed to negotiate instead of fighting, and although Roland refused to listen, C. agreed to treat, and received a captain's commission and a pension, while his father and other Protestant prisoners were liberated. As this treaty did not secure general liberty of conscience, C. was denounced as a traitor, and was so disheartened by his treatment everywhere, that he left France for Switzerland, and from thence passed to Holland, where he married. Having been authorized to recruit a regiment of Camisards to be sent to Spain, he proceeded to England, where he raised a regiment, and was sent by Queen Anne to Spain under the Earl of Peterborough and Sir Cloudsly Shovel, in May, 1705. At the battle of Almanza he was barely saved from death. After his return to England he was made a major-general and governor of Jersey, and finally governor of the Isle of Wight. He died at Chelsea. See CAMISAARDS; also sketch in *Dictionary of National Biography* (1887).

**CAVALIERI**, EMILIO DE', composer, was born in Rome about 1550, and died in Florence about 1600. He was of excellent family, received a good education, and was called to the Medici court in Florence as general inspector of art. He had studied various instruments and the theory of music, and he wrote numerous madrigals and short musical plays. Although he imitated Caccini and Peri, of whom he was in reality the precursor rather than a follower, he took no active part in the Florentine music reform. His great work was a dramatic oratorio, *La rappresentazione dell' anima e del corpo*, which was performed in Rome in 1600.

**CAVALIERE SERVENTE**. See CICISBEO.

**CAVALLI**, FRANCESCO (Pietro-Francesco Caletti-Bruni), composer, born in Crema, near Venice, in 1600, and died at Venice in 1676. His father was *maestro di cappella* at the church of S. Maria, and the boy's talent attracted the attention of Federigo Cavalli, podestà of Crema, who became his patron and by whose name he was known. He studied under Monteverde and was his greatest pupil and follower. He was made organist in S. Marco in 1665, and in 1668 became *maestro di cappella*, holding this post until his death. Cavalli was for a short time in the service of the elector of Bavaria, and visited Paris twice in 1660 and 1662. A collection of Cavalli's church music was published in Venice in 1656, and some vespers for eight voices in 1675. But it is as a dramatic composer that Cavalli is celebrated. He treated the style developed by Caccini,

Peri, and Monteverde with greater freedom in rhythm, and though his harmony is crude he gave greater dramatic and declamatory expression to the whole. He prepared the opera for Alessandro Scarlatti, and was the greatest dramatic composer of his time. His operas include : *Le Nozze di Tetide e di Peleo*, Venice, 1639 ; *La Didone*, 1641 ; *Il Giasone*, 1649 ; *Alessandro*, 1651 ; *Il Serse*, 1654 ; and *L'Artemisia*, 1656. See Ambros's *Geschichte der Musik* (vol. IV.).

**CAVALLINI**, PIETRO, 1259-1844 ; a Roman artist taught by Giotto, whom it is believed he assisted in the mosaic of the ship of St. Peter, in the porch of St. Peter's church. He was also an adept at painting, and his grand fresco of the crucifixion at Assisi is still in tolerable preservation.

**CAVALRY** is a general name for horse soldiers or troopers, and in the United States army it is divided into regiments, each of which is commanded by a colonel. There are ten regiments, eight being composed of white troopers and two of colored. The First Regiment was organized by act of Congress March 2, 1833, as the first regiment of dragoons, and the designation was changed to cavalry by act of August 3, 1861. The Second Regiment was organized by act of Congress, May 23, 1836, as the Second Regiment of Dragoons, converted into a regiment of riflemen by act of August 23, 1842, reconverted to dragoons in April, 1844, and the designation changed to cavalry in August, 1861. The Third Regiment was organized by act of Congress, May 19, 1846, as the regiment of mounted riflemen, and its designation changed to cavalry August 3, 1861. The Fourth and Fifth were organized March 8, 1855 as the First and Second Regiments of Cavalry, and the designation changed to Fourth and Fifth Regiments in August, 1861. The Sixth Regiment was organized by direction of President Lincoln, May, 1861, and confirmed by act of Congress in July, 1861. The Seventh, Eighth, Ninth, and Tenth were organized by act of Congress July, 1866. Besides the colonel there are allowed to each regiment 1 lieutenant-colonel, 3 majors, 12 captains, 12 first-lieutenants, and 12 second-lieutenants, besides two additional lieutenants, one for adjutant and the other for regimental quartermaster, 1 chaplain, 1 sgt.-major, 1 qrmr.-sgt., 1 chief musician, 1 saddler sgt., 1 chief trumpeter, 10 first sgts., 50 sgts., 40 corporals, 20 trumpeters, 20 farriers and blacksmiths, 10 saddlers, 10 wagoners, 353 privates. This gives 605 enlisted men to a regiment, or 6050 for the ten regiments of cavalry. The number of companies to which enlisted men are assigned has recently been reduced from twelve to ten by transferring the officers and men on duty with companies "L" and "M" to the other companies of the regiment, and leaving those two companies simply as "skeletons," assigning to them officers of the regiment who are away on detached service, or who have been condemned by medical boards as being unfit for further active service. Like the other arms of the service, the cavalry regiments are distributed among a great number of posts, and seldom are all the companies of a regiment on duty at the same place. On occasions of ceremony the cavalry follows the field artillery. The color of the facings and trimmings of the cavalry is yellow.

Egypt probably affords the earliest historical record of any distinct attempt at military organization, and from the earliest dates at which there is any record of armed men being systematically trained, cavalry has always formed an integral part. In early times chariots, although perfectly distinct from the cavalry, seem to have been intimately associated with it. Xenophon gives the first really authentic account of cavalry in his statement regarding the formation of cavalry into divisions by Lycurgus. In B.C. 371, Epaminondas raised a corps of 5000 cavalry; and from this time, armed horsemen were very much cultivated by generals commanding the armies, and many of their successes are due to the prowess of the cavalry. The Greeks had both heavy and light cavalry, and to these Alexander the Great added a third class, trained to fight both mounted and on foot. Cavalry fell into comparative disuse for a while, but in the latter days of the Roman republic it came again into favor, and was organized by the Romans into regiments of between seven and eight hundred men. The Gauls for many years furnished the principal part of the cavalry in use in Europe, and the reputation attained by these horsemen was of the highest order. Saddles were first used in the time of Constantine, and stirrups were introduced by the Franks about the middle of the fifth century. The invention of gunpowder and the decline of the feudal system made a change in military tactics, and cavalry as it now exists dates from about 1445. In the time of Francis I. of France his gens-d'armes were reckoned the best cavalry in Europe. They had, however, some years later to yield the palm to the Spaniards; they in turn gave way to the Germans, who brought in a new system of tactics and formed their men in six or eight ranks, instead of in one rank, which was the former prevailing custom. Maurice of Nassau was the first to train cavalry with a view to their mobility, and teach them to act as separate bodies and in distinct lines. During the Thirty Years' War the lance as a cavalry weapon gradually disappeared. Gustavus Adolphus was the next most prominent advocate of the cavalry arm, and his formation of three lines was quite generally adopted by the rest of Europe. The wars of Louis XIII. and Louis XIV. were great developers of the military art, and their cavalry was renowned. About this time armor and the lance were very generally abandoned. The Turkish horsemen were also greatly dreaded by their opponents, and the Russian infantry feared them to such an extent that they carried chevaux-de-frise in carts to protect themselves. Marshal Saxe was among the

first to recognize the great use of light cavalry for the purpose of reconnoitring and for celerity in movement on all occasions, and he showed a masterly understanding of the power gained by a combination of artillery and cavalry. Frederick the Great discontinued arming cavalry with fire-arms and did away entirely with firing in line. He gave wonderful examples of what careful training and thorough preparation can do when combined with rapidity of execution in the field. The genius of Napoleon grasped the great good that could be derived from a careful organization of the cavalry that would enable him to follow up and reap the fruit of his victories. The manner in which he employed his mounted scouts, and the reconnoitres that his cavalry constantly made, were very considerable factors in his success in outmanœuvring his enemies and anticipating their designs. The fact of his cavalry having been utterly demoralized in the Russian campaign, and of their not again being completely reorganized, prevented his following up his subsequent victories as brilliantly as he had formerly been able to do. The French cuirassiers were now armored to a greater degree than had been the custom for many years, and the lance was once more introduced, and has ever since been the arm of a portion of the cavalry force of Europe. The long peace that followed these campaigns, and the few opportunities when war did break out for the use of cavalry, conduced greatly toward its deterioration. In India many deeds of valor were accomplished by both English and native horsemen, but the European battlefields were, as a rule, unsuited for cavalry tactics. When Austria and Prussia fought in 1866 there was a large force of cavalry, but beyond reconnoitring little was really accomplished. A few lessons were learned, however, which bore excellent fruit later when France and Prussia came together. The cavalry of the latter was most carefully organized and drilled, and proved most efficient in gaining intelligence of the movements of the French. The information obtained, and the manner in which the German troops were masked, enabled their strategic movements to be brought to a successful issue. The French cavalry, on the other hand, were not as thoroughly equipped for service, owing greatly to the neglect that had attended military matters previous to the breaking out of the war, and the blow that the cavalry received at this time has lasted, as the prestige it once enjoyed has never since been attained. Great progress was made in the cavalry of the United States during the civil war. Although at first composed largely of inexperienced troops, the cavalry, before the war closed, was admirably organized and attained a well-deserved reputation for efficiency in both armies. Carbines, capable of firing a number of rounds without reloading, and sabres formed the arms. In the expeditions against the Indians in the West the cavalry added greatly to its laurels. Cavalry, as a rule, is placed in the rear of the infantry, on ground favorable to its manœuvres, and where it will be masked from fire until the moment arrives for bringing it into action. Here, if acting on the defensive, the cavalry watches its opportunity to support the other troops, driving back the enemy by prompt and vigorous charges, or if on the offensive, biding its time to rush upon the assailant when his ranks commence to waver or show signs of disorganization from the assaults of the other arms. The habitual formation for attack is in two lines, with a reserve or support in the rear. So long as infantry maintains its position firmly, particularly if the ground be at all unfavorable to the movements of cavalry, the chances are held to be against the successful attack of the latter.

**CAVAN**, an inland co. in the s. of Ulster, Ireland. It lies in the narrowest part of Ireland, 18 m. from the Atlantic, and 20 from the Irish sea. Area, 746 sq.m. About three fourths is arable. Bogs and hills, with many small lakes, are found in the n.w. The chief rivers are the Erne, the Woodford, and the Annalee. The e. half of C rests on clay-slate and graywacke; the mountain-district in the w. is carboniferous formation. Of minerals, C. affords coal, iron, lead, and copper, with many mineral springs. The climate is cold and damp; and the soil is poor, wet, and clayey, except along the streams. but considerable quantities of grain are produced. The population, which had fallen to 153,906 in 1861, was in 1881 only 129,476, of whom 104,328 were Roman Catholics, 18,990 Episcopallians, and the rest of other denominations. In 1891, the population was 111,917. Agriculture forms the chief industry, but linen is manufactured to a considerable extent. Chief towns—Cavan. Railieborough, and Belturbet. C. returns two members to parliament.

**CAVAN**, the capital of Cavan co., Ireland, is situated on a branch of the Annalee, 70 m. n.w. of Dublin, with which it is connected by the Irish N. W. railway. The suburbs are chiefly wretched cabins. The principal buildings are in the w. outskirts. The public garden was bequeathed by a late lady Farnham, and the beautiful demesne of lord Farnham lies between C. and Lough Oughter, which is about 5 m. west. Pop. about 3000. Agriculture forms the chief industry of the people.

**CAVARZERE**, a t. of Northern Italy, province of Venice, 22 m. s.s.w. of Venice city. It is situated on the Adige, which divides it into two parts, called C. *destro* and C. *sinistro*. Its soil is fertile, and its inhabitants carry on an active trade in cattle, silk, and wood for fuel.

**CAVATINA**, a short form of operatic air, of a soft character, differing from the ordinary aria in consisting only of one part, and that spun out more in the form of a song. Modern composers have, however, disregarded this difference. Rossini mixes both.



Weber, in his operas, adds an introduction or a recitative. The most perfect specimen of the C. is that in Meyerbeer's opera of *Robert the Devil*.

**CAVE**, EDWARD, deserves mention as the founder of the *Gentleman's Magazine*, the first literary journal of the kind ever established. He was b. at Newton, in Warwickshire, in 1691; obtained a good education at Rugby; and, after many vicissitudes, became apprentice to a printer. Obtaining money enough to set up a small printing-office, he projected the *Gentleman's Magazine*, which has now existed more than a century and a quarter. He was the friend and early patron of Samuel Johnson. D. Jan., 1754.

**CAVE**, WILLIAM, an English divine and scholar of distinction, was b. at Pickwell, Leicestershire, Dec., 1637. He studied at Cambridge; was appointed to the vicarage of Islington in 1662; afterwards to the rectory of Allhallows the Great, London; and in 1690 to the vicarage of Isleworth, Middlesex. He d. at Windsor, Aug. 4, 1713. He was the author of many works of a religious character, the most important of which are the *Lives of the Apostles*; *Lives of the Fathers*; and *Primitive Christianity*, which were once standard works.

**CAVEAT** (Lat. *caveo*, to beware), a judicial warning or caution. Caveats, in England, are used to stop the enrollment of decrees in chancery, the issuing of lunacy commissions, etc. It consists in an intimation by the party interested to the proper officer, to prevent him from taking any step without such intimation being made to the said party as shall enable him to appear and object.

**CAVEAT EMPTOR**, notice to a purchaser of property to beware or be watchful of his rights. In a sale of real estate the rights of the purchaser depend entirely upon the covenants of title which he receives; but personal property the purchaser takes at his own risk, unless the seller gives an express warranty, or the law should imply such warranty from the circumstance of the case and the nature of the thing sold, or unless the seller should be guilty of fraudulent misrepresentation or concealment in respect to a material inducement to the sale.

**CAVEAU**, a convivial and literary association in Paris, so called from meeting in a cavern known as "the cave." It was started in 1729, and continued about ten years. Dinners were given on the first Sunday in each month, which were attended by Helvetius, Crebillon, and other celebrities. The Caveau Moderne was started in 1806, and had dinner on the 20th of each month at the Rocher de Cancale. The association declined, but was reorganized in 1834, and in 1866 Jules Janin was received as a member. The meetings are now more formal and academical than convivial.

**CAVEDONE**, JACOPO, 1577-1660; an Italian painter, educated in the school of Caracci, and workman under them in the churches of Bologna. His chief productions are "The Adoration of the Magi," "The Four Doctors," "The Last Supper," and especially "The Virgin and Child in Glory," now in the Bolognese academy. He was at one time an assistant to Guido, in Rome. In his declining years he was broken down by the loss of a favorite son, and finally died in extreme poverty in a stable at Bologna.

**CAVELIER**, PIERRE JULES, 1814-94; a French sculptor, who studied under David d'Angers and Delaroche. He first gained celebrity about 1849 by a statue of "Penelope," for which he received the medal of honor and three years' pension. A few years later he became a member of the institute. Among his other works are "Truth," in the Louvre, a statue of Abelard, and busts of Napoleon, Ary Scheffer, and Horace Vernet.

**CAVENDISH COLLEGE**, founded, 1873, by the County College Association of Cambridge univ., in order to enable young undergraduates to pass through a university course at the least possible cost of money and time; and to make a specialty of the art of teaching. The present buildings of the college were begun, 1876. There are accommodations for 800 undergraduates. There were, 1890, about 33 students in residence.

**CAVENDISH**, FREDERICK CHARLES, Lord, 1836-82; second son of the duke of Devonshire; was educated at Trinity col., Cambridge; and became private sec. to Lord Granville, 1859. He represented the West Riding of Yorkshire in Parliament, from 1865 to the day of his death. Under Gladstone he was appointed financial sec. to the treasury, having already become a lord of that department. C. was appointed chief sec. of Ireland, 1882, succeeding Forster, but was assassinated almost immediately upon his entrance into office. C. was greatly esteemed, and his record gave warrant to the belief that his policy in this difficult post would be both creditable to England and helpful to the suffering in Ireland. The assassination was denounced by the Irish press and home-rulers.

**CAVENDISH**, HENRY, a distinguished philosopher of the 18th c., son of lord Charles Cavendish, and nephew of the third duke of Devonshire, was born at Nice, Oct. 10, 1731. He studied at Cambridge, and devoted his whole life to scientific investigations. The large fortune which was bequeathed to him by an uncle, enabled him to follow uninterruptedly his favorite pursuits. He almost secluded himself from the world, and was so averse to meet with strangers, that he had his library—a magnificent one—built at a distance from his house, so that he might not encounter persons coming to consult it; and his female domestic servants had orders to keep out of his sight, on pain of dismissal. His dinner he ordered daily by a note placed on the hall-table. He died, unmar-

ried, Feb., 1810, leaving considerable more than a million sterling to his relatives. As a philosopher, C. is entitled to the highest rank. To him it may almost be said we owe the foundation of pneumatic chemistry, for prior to his time it had hardly an existence. In 1760, he discovered the extreme levity of inflammable air, now known as hydrogen gas—a discovery which led to balloon experiments, and projects for aerial navigation; and later, he ascertained that water resulted from the union of two gases—a discovery, however, to which Watt (q.v.) is supposed to have an equal claim. The accuracy and completeness of C.'s processes are remarkable. So high an authority as sir Humphry Davy declared, that they "were all of a finished nature, and though many of them were performed in the very infancy of chemical science, yet their accuracy and their beauty have remained unimpaired amidst the progress of discovery." C. also wrote papers on electricity, astronomical instruments, etc.

**CAVENDISH, THOMAS**, abt. 1555-92; third circumnavigator of the globe. He studied for a brief period at Cambridge, but left without a degree, followed the court, and soon squandered his inheritance, to repair which he turned to maritime adventure, and fitted out a ship that accompanied sir Richard Grenville's expedition to Virginia in 1585. In July, 1586, he sailed from Plymouth with three vessels on a predatory expedition, passed through the straits of Magellan, cruised along the west coast of South America and Mexico, and burned or sunk 19 vessels, among which was the *Santa Anna*, belonging to the king of Spain, and having an immensely valuable cargo, which he seized off California. He returned to Plymouth Sept. 9, 1588, with his plunder, having gone around the globe in 2 years and 50 days. When he came home it was said that his seamen were clothed in silk, his sails were of damask, and his topmast was covered with cloth of gold. Within three years he wasted his wealth, and died on another voyage.

**CAVENDISH, Sir WILLIAM**, 1505-57; brought up in the family of cardinal Wolsey, whom he served as gentleman-usher of the chamber. He was present at the death of the cardinal, and delayed his attendance at court to see the remains of his patron properly cared for. The act so pleased Henry VIII. that he made Cavendish a member of his household, treasurer of his chamber, and a privy councillor, subsequently adding the dignity of knighthood. He filled other offices, and obtained grants of valuable lordships in Hertfordshire. His great property became the foundation of the immense estates of the dukes of Devonshire. He seems to have retained favor through the reigns of Edward VI. and Mary. He was the author of *The Life and Death of Cardinal Wolsey*.

**CAVENDISH, WILLIAM**, duke of Newcastle, a distinguished loyalist of the 17th c., son of sir Charles Cavendish, younger brother of the first earl of Devonshire, was b. 1592. His learning and winning address made him a favorite at the court of James I., who, in 1610, made him a knight of the Bath. Other honors rapidly succeeded. In 1620, he was made a peer of the realm. Charles I., about 1628, gave him the title of earl of Newcastle-upon-Tyne, and in 1638 intrusted him with the tuition of his son, afterwards Charles II. His support of the king during the contest with the parliamentary forces was munificent. He contributed £10,000 to the treasury, and raised a troop of 200 knights and gentlemen, who served at their own cost. As general of all the forces raised n. of the Trent, he had power to issue declarations, confer knighthood, coin money, and raise men; and the last part of his commission he executed with great zeal. The banquets C. gave to the king when he went n. were magnificent enough to find record in history; one of them cost no less than £15,000, even in those days when money was more valuable than it now is. After the battle of Marston Moor, C. retired to the continent, where he resided, at times in great poverty, until the Restoration. On his return, he was created duke of Newcastle. He died Dec. 25, 1676.

**CAVENDISH'S EXPERIMENT.** See EARTH.

**CAVE-DWELLERS.** The primitive inhabitants of most civilized countries were troglodytes, or cave-dwellers. The cave-dwellers of the so-called palæolithic period were to all appearance contemporaneous with the mammoth, the woolly-haired rhinoceros, and the great cave carnivora. In England, France, Belgium and other countries of Europe, numerous caves have been explored which were doubtless the habitations and workshops of the men of this early period. These caverns vary in character and dimensions, but all agree in being recesses capable of affording comparatively dry and commodious shelter. Hence they were resorted to as places of habitation by wild beasts and by men. It is evident in the case of some of these caverns that they were first inhabited by the extinct carnivora of that period, as, for example, in the famous Kent's Hole cave of Devonshire, England. See KENT'S CAVERN. In this cave bones and teeth of the fossil elephant, rhinoceros, horse, cave-bear, hyena, reindeer and Irish elk have been found, and along with these, numerous weapons and implements of chipped flint, horn, and bone, the unmistakable proofs of man's presence. At Brixham (q.v.) a bone cave (q.v.) was discovered in 1858, containing bones of the mammoth, rhinoceros, horse, hyena, and reindeer, besides palæolithic flint implements. In the caves at Perigord (q.v.), in central France, various drawings of animals, including the reindeer, have been found cut on bone and stone, apparently with a pointed instrument of flint. The most remarkable of all these is the portrait of a mammoth, seemingly executed from the life. This portrait was outlined on a plate of ivory found in the Madeleine cave, on the river Vézère, by M. Lartet when in the company of M. Verneuil and Dr. Falconer. The drawings

found in these caves include animals, singly and in groups, such as the mammoth, reindeer, horse, and ox; also fish, flowers, and, finally, rude attempts at the human form. These caves, which were explored by M. Lartet and Mr. Christy in 1863-64, penetrate the sides of the valleys of the rivers Dordogne and Vézère, and not only afford cumulative evidence of the co-existence of man with the extinct mammalia, but also give us a clue to the characteristics of the race that so existed, presenting as vivid a picture of the life of that period as the one given us of Italian manners of the first century by the discoveries in the buried cities of Herculaneum and Pompeii. The old floors of human occupation consist of broken bones of animals killed in the chase, mingled with rude implements and weapons of bone and unpolished stone, and with charcoal and burnt stones which indicate the position of the hearths. Flakes without number, awls, lance-heads, hammers, and saws, made of flint, are mixed with bone needles, sculptured reindeer antlers, arrowheads, harpoons, and bones of the reindeer, bison, horse, ibex, saiga antelope, and musk sheep. These heaps mark the site of the habitations of the ancient hunters, and are simply the refuse cast aside by them. The reindeer, which then probably lived in France in great herds, formed the chief article of food. Relics of the cave bear and the lion have been met with in one locality, of the mammoth in five, and their remains bear marks of cutting and scraping which show that they fell a prey to hunters. Beside the figure of the mammoth already referred to, we may mention also the outline of an ox on a piece of antler, on another the figure of a man standing close to a horse's head, and on the other side of this same cylinder two heads of bisons drawn with great clearness. These drawings probably employed the idle hours of the hunters and reproduce for us the sights they witnessed in the chase. To sum up, these early dwellers in France lived by hunting and fishing; they were clad with skins sewn together with sinews or strips of intestines; they had no domestic animals, and were not acquainted with spinning or the potter's art. It has been confidently asserted that this people is to be connected with the Eskimos, the arguments in support of this view being set forth as follows: The bone needles, and many of the harpoons, flint spear-heads and the like, found at Perigord, are of precisely the same form as those now in use among the Eskimos. Again, the artistic designs from the caves of France, Belgium, and Switzerland are identical in plan and workmanship with those of the Eskimos, with this difference only, that the hunting-scenes familiar to the one were not known to the other. The reindeer, however, which both knew, is represented in the same way by both. The habit of accumulating large quantities of bones round their habitations and of splitting the bones for the sake of the marrow is the same with both. These and other facts, it is argued, can hardly be mere coincidences arising from the circumstance that the two peoples led a savage life under similar conditions. Hence it is urged that so far as our evidence goes as to the racial affinities of the cave-dwellers, that evidence points only to the Eskimos.

In the caves of Kentucky, half-burnt torches of cane, utensils, ornaments, braided sandals, and other signs of prehistoric occupancy have been found. In Brazil, celebrated bone-caves exist in the upper São Francisco basins, which have been especially studied by the Danish naturalist Lund. In some the remains of extinct animals of high antiquity have been found, as of the mastodon, glyptodon, toxodon, and megatherium, with which the stone implements and remains of man have been so buried as to point to the co-existence of man and these animals. In the Delaware valley near Trenton, and on the Little Miami River, in Ohio, and at Little Falls, Minnesota, palæolithic remains have been found, consisting of portions of skulls and implements made of different materials; at Trenton, chiefly of argillite, in Ohio of black chert and a hard dark pebble, and in Minnesota of quartz. Prof. F. W. Putnam having compared these with specimens from France and England, concluded that they bore similar marks of human workmanship, "so evident and so uniform in their character as to leave the supposition of their having been the result of accident altogether out of the question." See the articles *TROGLODYTES* and *PETRA* for cave-dwellers of historical times. Within the period covered by authentic history, caves have been used either permanently as dwelling-places or occasionally as retreats in time of danger, while others have been used as cells, hermitages, places of worship or burial places. Artificially excavated caves are not uncommon in the cliffs of Scottish river ravines, as at Hawthornden near Edinburgh and in the valley of the Jed, in Roxburghshire. Such caves usually occur in soft rocks like sandstone. In the Canary islands, the Guanches have excavated caves under the lavas, by raking out the loose scorix and cinders which so commonly occur in that position. Vast areas in central China are covered with a coherent loam, in which dug-out habitations are of common occurrence. A similar deposit in this country exposed along the bluffs of rivers has been utilized in the same way by early inhabitants. In Arizona, parts of Colorado, Nevada, Utah, and southeastern California, the rocky, precipitous walls of deep cañons are in places riddled with human habitations, whose builders perhaps are likewise the builders of the pueblos, or stone ruins in the valleys. Some assume them to have been the ancestors of the present Pueblos, others make them akin to the Aztecs. The use of caves for hermitages belongs to all ages, and caves of very different kinds have been so employed, so that we are presented with every variety of artificial rock excavation, from simple hollows scraped out of some soft, yielding material, to the richly ornamented grottoes and temples of Ellora (q.v.), which are cut out in red granite.

**CAVES**, or **CAVERNS** (Lat. *cavus*, hollow), are hollow places in the earth. They are either natural or artificial. Natural C. have been produced by the fracture and dislocation consequent on the upheaval of the strata, by water, or by both causes combined. The denuding or eroding power of water, which has produced the materials of stratified rocks, has formed caverns in the courses of rivers and on the coast-line of the sea. The moving waters, carrying with them gravel and sand, enter natural cracks and crevices, and, by abrading their walls, increase their size, so as to form C.; or they attack less indurated portions of the solid strata, and form cavities bounded by the harder rock. Such caverns are of frequent occurrence round the shores of Britain, and indicate, where they occur, an ancient sea-margin of the island. In limestone rocks, the destroying power of water is increased when it contains chemical agents which have the power of dissolving the substance of the rock, and so causing it to be carried off in solution by the water.

C. most frequently occur in limestone rocks. They especially abound in the oolitic limestone, which on this account was called by the earlier continental geologists "cavern limestone." The celebrated C. of Franconia in Germany, of Kentucky (q.v.) in America, that of Kirkdale in Yorkshire, and many others, occur in this formation. Next to limestone, the triassic measures, containing rock-salt, a material easily removed by water, most abound in caverns. They are also frequently met with in igneous rocks—the picturesque cave of Fingal, in Staffa, is formed in basalt; and in South America and Iceland the modern lava contains large caverns.

Many caverns have a calcareous incrustation lining their interior, giving them a gorgeous appearance. Sometimes this deposit is pure white, and has, when the cave is lighted up, a richness and transparency that cannot be imagined. It is, however, more generally colored by the impurities which the water has taken up from the superincumbent strata. To the incrustations which are suspended from the roof, like icicles, the name stalactite is given, while those rising from the floor are designated stalagmites. Sometimes the pendent stalactite is produced so as to meet the ascending stalagmite, and form pillars, as if to support the roof, as in the "organ" in the Blue John Mine, Derbyshire. The source and origin of this deposit has been satisfactorily explained by Liebig as follows: The mold of the superficial soil, being acted upon by moisture and air, evolves carbonic acid, which is dissolved by rain. The rain-water thus impregnated, permeating the calcareous strata, has the power of taking up a portion of the lime, which it retains in a liquid condition, until from evaporation the excess of carbonic acid is parted with, when the lime again returns to its solid state, and forms the incrustation.

C. have an additional interest to the geologist, from the occurrence in many of osseous remains under the calcareous incrustations of the floor. The bones are imbedded in mud, and frequently concreted into a firm calcareous breccia. They belong to the pleistocene period, when the C. in Europe were inhabited by large hyenas and bears. Portions of other animals inhabiting the neighborhood were dragged by them into their dens, to serve as food. In this way the bones of herbivorous and other animals are found mixed with those of the beasts of prey; they have a broken and gnawed appearance, similar to what is produced on recent bones by the teeth of a hyena. No less than 33 species of mammals and 5 species of birds have been discovered in the C. of the British islands, of which about the half still survive in Europe, while the remainder are extinct. The mammals are species of ox, deer, horse, wolf, dog, hare, fox, weasel, water-rat, mole, bat, hippopotamus, and rhinoceros, besides the hyena and bear; and the birds are species of lark, partridge, pigeon, goose, and crow.

The most productive ossiferous cavern in Britain is that of Kirkdale, 25 m. from York, in which the remains of about 800 hyenas have been detected, besides innumerable gnawed bones of those animals on which they preyed. The carboniferous limestones of Glamorganshire abound in caves which have been explored by Buckland, and more recently and thoroughly by Dr. Falconer.

Ossiferous C. occur in all parts of the globe. The fossils of those in Australia show that the fauna of the pleistocene period had a remarkable resemblance to that of the present day. The remains consist chiefly of kangaroos and allied genera of marsupials.

**CAVIA'NA**, an island of Brazil, in the mouth of the river Amazon, about 35 m. long by 20 wide; fertile and well-stocked with cattle. The little town of Robadello, on the s.e. coast of the island, is almost exactly under the equator.

**CAVIARE**, the salted roes of the common sturgeon (*accipenser sturio*) and other fishes of the same genus. See **STURGEON**. It is chiefly prepared in Russia, where it is greatly esteemed as an article of food. It is also used to a considerable extent in Italy and France. The species of sturgeon from the roe of which it is chiefly prepared, inhabit the Caspian and Black seas and their tributary rivers. Among them are the bielaga, or great sturgeon (*accipenser huso*), the osseter (*A. guldenstadti*), the scherg or sevruga (*A. stellatus*), and the sterlet (*A. ruthenus*). The C. made from the roe of the last-named species is esteemed particularly delicious, and is reserved for the Russian court. Astrakhan is a principal seat of the preparation of caviare. More than 400,000 lbs. of C. have been prepared in the Caspian fishery in a single year.

**CAVITÉ**, a t. of considerable importance on the island of Luzon, one of the Philippines. It is situated on the bay of Manila, 10 m. s.s.w. of the city of that name, of which

It forms the quarantine station. It has a large cigar manufactory, is the chief naval depot of the Spanish possessions in the east, and gives name to a province with a pop. of 57,000. The population of the town itself is some 6,000 or 7,000.

**CAVOE**, or **CAVOUR**, a t. of n. Italy, situated at the foot of the Alps, 7 m. a.s.e. of Pinerolo. It has manufactures of silk-twist, linens, leather, etc., and marble and slate quarries. Pop. about 8000.

**CAVO-RILIEVO** (Ital.). In this peculiar kind of rilievo, which was extensively employed by Egyptian artists, the highest surface of the object represented is only on a level with the plane of the original stone, the rounded sides being cut into it. The effect resembles that of a concave seal. It is correctly described as *intaglio rilievato*. A wood-cut is given in Fairholt's *Dictionary of Terms in Art* of the Egyptian king Amunoph III. in hieroglyphics.

**CAVOUR**, Count **CAMILLO BENSO DI**, a distinguished Italian statesman of the 19th c., the descendant of a noble and wealthy family of Piedmont, was b. at Turin, Aug. 10, 1810. He was educated for a military career, but his liberal tendencies being likely to prove an insuperable barrier to his promotion, he retired during the stirring events of 1830-31, and devoted himself to agriculture, in which he introduced great improvements. He was the first to use guano in Piedmont; and, at his instigation, a national agricultural society was formed. During a residence in England, he made himself intimately acquainted with the political organization of the country, and also with its industrial institutions; knowledge of which he made good use on his return to his own country in 1842. In conjunction with Count Cesare Balbo, he in 1847 established a political daily journal, in which he advocated the interests of the middle classes—a representative system, somewhat after the pattern of the English constitution, as opposed alike to absolutism on the one hand, and mob rule on the other. On his suggestion, the king was petitioned for a constitution, which was granted in Feb., 1848. As a member of the chamber of deputies, during the stormy period which succeeded Charles Albert's declaration of war against Austria in Mar., C. strenuously opposed the ultra-democrats, and counseled an alliance with England as the surest guarantee for the success of the Italian arms. In the marquis d'Azeglio's ministry, formed soon after the fatal battle of Novara, C. was successively minister of agriculture and commerce, minister of marine, and minister of finance; and in 1852 he was appointed to succeed d'Azeglio as premier. From this time until his resignation in 1859, in consequence of the conclusion of the peace of Villafranca, C. was the originator as well as the director of the Sardinian policy. Taking upon himself at different times, in addition to the premiership, the duties of the ministers of finance, commerce, and agriculture, and latterly of home and foreign affairs, he greatly improved the financial condition of the country, introduced free-trade, consolidated constitutionalism, weakened clerical influence, and made Sardinia a power of some account in Europe, by bringing her into alliance with England and France against Russia. The dispatches which C. penned in reply to those of Austria, prior to the outbreak of the Italian war, are on all hands acknowledged as masterpieces of astute diplomacy. In Jan., 1860, C. was again called upon to preside over the Sardinian government, the duties of foreign minister likewise devolving upon him, and temporarily those of the minister of the interior also. At his death (June 6, 1861), he was prime minister of the new kingdom of Italy. See **MAZADE**, *Cavour* (1877).

**CA'VY** (*cavia*), a genus of quadrupeds of the order *rodentia*, regarded as the type of a family, *cavida*, differing from the hare family (*leporida*), in the complete want of clavicles, in the want of growing roots to the molar teeth, and in having the incisors situated as in other quadrupeds generally, and not in the peculiar manner so characteristic of the hares. There are four molar teeth in each jaw, and in the genus *C.* these are compound; and the genus is further characterized by four toes on each of the fore-feet, and three on each of the hind-feet, by the feet not being webbed, by the females having only two teats, and by the want of a tail. One species, *cavia cobaya*, has been long well known as a domesticated animal, and has been a common pet and plaything of children in Europe, almost from the time of the discovery of America. It is sometimes called the **COMMON C.** or **RESTLESS C.**, but much more frequently receives the name of **GUINEA-PIG**, although it is neither nearly related to pigs, nor a native of Guinea. Perhaps *Guinea*, in this name, may be a corruption of *Guana*, the cavies, and indeed the whole family of the *cavida*, being exclusively South American. The colors which the domesticated *C.* exhibits have never been seen in any of the wild cavies of South America; and as it is known to have exhibited the same variations of color from about the time of its introduction into Europe, it is supposed to have been long domesticated by some of the South American tribes. The Guinea-pig multiplies with a rapidity exceeding that of any other known quadruped, producing young ones when only two months old, and afterwards at intervals of two months, and from four to twelve in a litter. This extraordinary fecundity is probably not so much the result of domestication, as a provision for the preservation of the race in a wild state, the little animal being very defenseless and destitute of means of escape, the ready prey of every carnivorous beast and bird.—The other species of *C.* much resemble the Guinea-pig. Some of them are very numerous in some parts of South America, and are sought for food, although no such use is made of the domesticated cavy. See *illus.*, **RODENTIA**, vol. XII.

**CAWDOR**, or **CALDER**, a parish in co. Nairn, Scotland, noted as the site of Cawdor castle in which Shakespeare places the murder of Duncan by Macbeth. But the murder took place 400 years before the castle was built—which may prove that Shakespeare was “not for a day but for all time.” During the rebellion of 1745, lord Lovat was for a time concealed in this castle.

**CAWK**, a popular name for a massive variety of the mineral called heavy spar or sulphate of baryta. See **BARYTA**.

**CAWNPORE**, a city of the Doab, on the right bank of the Ganges, about 140 m. above Allahabad, at the junction of the Jumna, being separated by the river from Oude, whose capital, Lucknow, lies 58 m. to the n.e. The lat. is 26° 29' n., and the long. 80° 25' east. The stream in front, varying, according to the season, from 500 yards in width to more than a mile, presents a large and motley assemblage of steam-vessels and native craft. C., at least as a place of note, is of recent origin, being indebted for its growth, besides its commercial facilities, partly to military and political considerations. Since 1868 it has been brought into direct communication with Bombay through the opening of the railway to Jhansi, and it is one of the chief railway centres in India. In 1777, being then an appendage of Oude, it was assigned by the nawab as the station of a subsidiary force; and in 1801 it became, in name as well as in fact, British property. During the mutiny of 1857, C. was the scene of Nana Sahib's massacre of his English captives. Though C. is only 379 ft. above the sea, yet, during winter, considerable quantities of ice are made for preservation, through the exposing of water by night in shallow vessels. Pop. '91, of C. (spelt also *Khanpur*), 163,800; including cantonment, 188,712.

**CAWNPORE**, the district of the above-described city, in the lieutenant-governorship of the n.w. provinces. Occupying the entire breadth of the Doab, it touches at once the Jumna and the Ganges; while to the eastward it has Futtehpore, and, to the westward, Etawah and Furruckabad. With a pop. in '91 of 1,210,000, it has an area of 2,370 sq. m., stretching in lat. from 25° 55' to 27° n., and in long. from 79° 34' to 80° 37' east. It is an alluvial plain of great fertility. The vine is cultivated, and indigo grows wild. Besides its two mighty rivers and their navigable tributaries, the Ganges canal traverses the country for about 60 miles.

**CAXAMARCA**, or **CAJAMARCA**, a province in the n.w. of Peru, with a capital of its own name. It is on the e. side of the Andes, forming part of the basin of the Marañon. The province has about 213,000 inhabitants.

**CAXAMARCA**, or **CAJAMARCA**, a Peruvian city, the capital of the province of the same name, on the e. side of the Andes, in a fertile valley at an elevation of more than 9,000 ft. above tide, 7° 7' s. and 78° 31' w.; 72 m. n.n.e. of Truxillo. The streets are regular, but most of the houses are of clay. There are two or three fine churches, a monastery, a nunnery, and the remains of the palace of Atahualpa, the last of the Incas of Peru, who was murdered there by the Spaniards in 1533. Near the city are the sulphur springs of Pultamarca, called “the Inca's baths,” which have a temperature of 156° and are much frequented. There are manufactures of wool, linen, steel, silver, etc., and a good trade with Truxillo. A railway connects C. with the port of Pacasmayo. Pop. 12,000.

**CAXAMARQUILLA**, a t. of n. Peru, about 15 miles from Lima. It contains interesting ruins of Yuncan Indians.

**CAXATAMBO**, or **CAJATAMBO**, a t. of n. Peru, in the province of Ancachs, 120 m. n.n.e. of Lima, with a pop. of about 4,000. There are silver-mines in the neighborhood.

**CAXIAS**, a t. in Brazil on the river Itapicuru, about 300 m. s.e. of Maranhao. It is a place of large trade in rice, cotton, cattle, etc. Pop. about 10,000.

**CAXTON**, **WILLIAM**, who introduced printing into England, was b. in the Weald of Kent, about 1422. The particulars of the life of this great benefactor of his country are scanty. He was apprenticed in 1439 to Robert Large, a wealthy London mercer. At the death of the latter in 1441, he went to Bruges, where in 1462 or 1463 he seems to have been governor of a chartered association of English adventurers trading to foreign parts. In 1471, C. entered the service of Margaret, the duchess of Burgundy, formerly an English princess; and apparently towards the end of 1476 he set up his wooden printing-press at the sign of the red pale in the almonry at Westminster. The art of printing he had acquired during his sojourn in Bruges, doubtless from Colard Mansion, a well-known printer of that city; and in 1474 he put through the press the first book printed in the English tongue, the *Recuyell of the Historyes of Troye*, a translation of Raoul le Fevre's work. The *Game and Playe of the Chesse* was another of C.'s earliest publications; but the *Dictes and Notable Wise Sayings of the Philosophers*, published in 1477, is the first book which can with certainty be maintained to have been printed in England. All the eight founts of type from which C. printed may be called black letter. Of the 99 known distinct productions of C.'s press, no less than 38 survive in single copies or in fragments only. C., who was an accomplished linguist, and translated many of the works that issued from his press, was diligent in the exercise of his craft or in translation till within a few hours of his death, which seems to have happened about the close of the year 1491. In 1877, the printer and his work were fittingly commemorated by a

typographical exhibition in London. See *The Old Printer and the New Press*, by Charles Knight (1854); *Life and Typography of William C.* (1861-63), by W. Blades; and the *Biography and Typography of C.* (1877), by the same author.

**CAYAMBE**, or **CAYAMBE-URCU**, a peak of the Andes, 45 m. n.e. of Quito, in Ecuador. It is of regular conical shape, 19,250 ft. high, and always capped with snow. It is especially notable for being situated almost exactly under the equator.

**CAYCOOS**. See **CAICOS**.

**CAYENNE**, a fortified seaport capital of French Guiana, on the west point of an island of the same name at the mouth of the river Oyak. The roadstead is excellent, and the port commodious but shallow. C., though it is the entrepôt of all the trade of the colony, is chiefly known as a great French penal settlement. The island, 32 miles in circumference, is separated from the mainland by a narrow channel, its soil is fertile, but the climate is extremely unwholesome for Europeans, large numbers of the convicts having been carried off by various malignant fevers. C. became a French colony about 1635; deportation hither began during the first French revolution. It has a considerable commerce, exporting coffee, indigo, sugar, cotton, cacao, etc. In 1891 it was connected by telegraph with Demerara. Pop. about 8,000.

**CAYENNE CHERBY**. See **EUGENIA**.

**CAYENNE PEPPER** consists of the powder of the dried pods, and more especially of the dried seeds of different species of *Capsicum* (q.v.), particularly of *C. frutescens*.

**CAYES**. See **AUX CAYES**.

**CAYLEY**, **ARTHUR**, English mathematician, born in Surrey in 1821; was a lawyer in early life, but became professor of pure mathematics at Cambridge in 1861; lectured in U. S. in 1882. He died in 1885.

**CAYLEY**, **SIR GEORGE**, 1733-1857; an English physicist and inventor. whose experiments on the steam engine resulted in the invention of the air engine. Among his other inventions was an arrangement for applying the power of electricity to machinery. He was one of the originators of the London polytechnic institution, and late in life was a member of parliament for Scarborough.

**CAYLUS**, **ANNE CLAUDE PHILIPPE DE TUBIÈRES**, Count de, Marquis d'Esternay, Baron de Bransac, 1692-1765. When young he served with distinction in the French army, but after the peace of Rastadt (1714) he traveled extensively in Europe and the east, studying and collecting antiquities, on which he published several works. He rediscovered the method of encaustic painting with wax, mentioned by Pliny. He was also an engraver, and copied many of the famous pictures of the old masters. But he is best known as the author of several romances, humorous pieces, and fairy tales.

**CAYLUS**, **MARTHE MARGUERITE DE VILLETTE DE MURCAY**, Marquise de, 1673-1729; a descendant of the family of D'Aubigne, but converted by Mme. Maintenon to the Roman Catholic faith. She acquired celebrity as one of the leaders of court society. Racine so admired her abilities that he wrote the prologue to his tragedy of *Esther* as a compliment to her. Her first husband, the marquis de Caylus, was worthless and dissipated. After his death, she became the mistress of the duke of Villeroi, for which she was sent away from the court; but after the death of Mme. Maintenon she was restored to favor. Voltaire edited her *Souvenirs*.

**CAYMAN**, a name somewhat variously used, either as the distinctive appellation of some, or as a common name for all the *crocodilidae* of South America. See **ALLIGATOR**. The genus *alligator* is by some naturalists of the present day divided into three genera, to one of which the name *C. (caiman)* is appropriated, and of which the type is the species called the eye-browed *C. (alligator palpebrosus)*, to which the name *C.* is distinctively applied in Surinam and Guiana, a species very abundant there, but not one of the largest or more dangerous of its tribe. It is remarkable for the three bony plates, separated by sutures only, which form each eyebrow or eyelid, projecting as large knobs like a man's fist; and this, and the scarcely webbed-feet, constitute the most important characters of the genus or subgenus *cayman*.

**CAYMANS**—in English, *alligators*—three low islets of the Caribbean sea, which form a dependency of Jamaica, being 130 m. to the n.w. of it. Grand C., the largest of the group, is about 30 m. long and 5 wide. Discovered by Columbus, they were by him called Tortugas, from the abundance of turtle. The soil yields corn and vegetables; and the people rear hogs and poultry; mahogany, dye-woods, and phosphates are also produced, and cocoanuts are exported.

**CAYUGA**, a co. in w. central New York, extending from lake Ontario half-way across the state, intersected by the New York Central and several other railroads; 773 sq. m.; pop. '90, 65,302. It is a fine agricultural section, with undulating surface. Gypsum, salt, and limestone are among the minerals. Near the center of the co. lies Owasco lake, about 10 m. long, and on the w. border is Cayuga lake. Co. seat, Auburn.

**CAYUGA LAKE**, a fine navigable sheet of water in w. central New York, 88 m. long, and from 1 to 3½ m. wide. At the n. end it is shallow, but in some places it is very deep. It is 377 ft. above tide water, and 146 ft. higher than lake Ontario, into

which it empties through Seneca river. The lake is much frequented by tourists and pleasure seekers.

**CAYUGAS**, one of the Indian tribes forming the Six Nations in New York. They built the villages around Cayuga lake in central New York, and, when first known by the French explorers from Canada, were able to muster several hundred warriors. The C. were, with the other Iroquois, against the French in the wars of the 17th century. A few of their chiefs became Christians; and one who was taken in war and sent to the galleys in France, on his return to Canada became a friend of the white man. In the American revolution they were on the English side. After peace, they ceded nearly all their lands to the state except a small reservation, and that they abandoned about 1800, when some of them went to the Senecas, some to Canada, and others to the Indian country. Scarcely 170 of the tribe now remain.

**CAZAL'A DE LA SIERRA**, a t. of Spain, in the province of Seville, 89 m. n.e. of the city of that name. It is situated on a declivity of the Sierra Morena; the district around is mountainous and well wooded, and abounds in minerals of various kinds, including iron, silver, copper, sulphur, and marble. The inhabitants, numbering about 8500, are chiefly employed in smelting metals, manufacturing cannon, machinery, and agricultural implements. Some tanning, weaving, etc., are also carried on.

**CAZALES**, EDMOND DE, French political writer, 1804-76; studied law and received a legal appointment, but soon gave his chief attention to political affairs, being largely occupied with the question of the reconciliation of the Roman Catholic church with the principles of the Revolution. In 1843 he took holy orders, and two years later became the director of the ecclesiastical seminary of Montauban. He was active during the revolution of 1848 and in the events of 1871-72. Among his writings are various articles in periodicals, *A Historical and Critical Study of Contemporary Germany*, in 1853, and *Our Evils and their Remedies*, in 1874.

**CAZALES**, JACQUES ANTOINE MARIE DE, French politician, 1758-1805. He won some distinction as an orator, and pleaded the royalist cause in the National Assembly in 1789.

**CAZEMBE**, or KAZEMBE, a country in central Africa, n. of lake Bangweolo, taking its name from the title of the ruler. The district is included in the British South Africa company's territory. Cazembe is also the name of a native village near the southern end of lake Moero.

**CAZENOVIA**, a village in Madison co., N. Y., on Cazenovia lake and the Lehigh Valley and the West Shore railroads. It is in an agricultural and dairying region, and has Cazenovia Seminary (Methodist Episcopal), public library, and weekly newspaper. Pop. '90, 1987.

**CAZIN**, JEAN CHARLES, French painter, b. about 1840; studied under Lecoq de Boisbaudran; received a medal of the first class in 1882, and became a member of the Legion of Honor in 1890. He has painted figures and landscapes, but even where figures occur the interest of the pictures is centered in the scenery; so he is properly classed with landscape painters. Among his paintings are "The Flight into Egypt" (1877), "Ishmael" (1880), "Tobit" (1880), and "Judith" (1883). Their chief merit lies in the soft and beautiful coloring.

**CAZIQUE**. See CACIQUE.

**CAZOR'LA**, a t. of Andalusia, Spain, 40 m. e.n.e. of Jaen. C., which is a place of considerable antiquity, is pleasantly situated on a declivity, and is well watered by the Vega; has two old castles—one an Arab structure—manufactures of leather, earthenware, soap, and bricks, and a trade in agricultural produce. Pop. 6200.

**CAZOTTE**, JACQUES, French poet, b. 1719, wrote the romance of *Olivier* (1763), *Le Diable Amoureux* (1771), *Le Lord Impromptu* (1772), etc. He was guillotined as a royalist by the revolutionary tribunal in 1792.

**CEANO'THUS**. See RED ROOT.

**CEARA**, a province of Brazil, on the n. coast, situated in lat. 2° 40' to 7° 25' s. long. 37° 40' to 41° 30' west. It has an area of 40,253 sq. m., with, '90, 881,686 inhabitants. It abounds in balsams, gums, resins, and fruits; and among its minerals are gold, iron, copper, and salt. The port of C. has an extensive harbor; is the terminus of a railroad, and has a large trade. Its pop. in 1892 was 35,000.

**CEBADILLA**. See SABADILLA.

**CEBES**, a Greek philosopher, disciple of Socrates, mentioned by Plato and by Xenophon as distinguished for virtue and love of truth. The work *Tabula Cebetis* attributed to him professes to be an explanation of an allegorical picture, and begins with the Platonian doctrine that men enter the earth from a pre-existent state, in which they were taught how to guide their course in this world; but the draught of oblivion, which all



must drink, though not in equal quantities, causes them to forget the instructions. Many allurements entice them to vice, but by patience and endurance they may attain to virtue and happiness. Sciences are declared not to be the true discipline, but yet to be useful, especially as restraint for the young.

**CEBU**, a city on the island of Cebu, one of the Philippines, 400 m. s.e. of Manila. Cebu is the oldest provincial town in the archipelago, and still ranks as one of the best built, while its position makes it the chief commercial center for the southern Philippines. It is the residence of a military governor, and an alcalde, as well as the governor-general of the Vissagas. There are exports of sugar, hemp, tobacco, Japan-wood, etc. The grave of Magellan, the navigator, is on the island of Matan, opposite the town. Pop., inclusive of the suburb of St. Nicholas, about 34,000.

**CEBU**, or **ZEBU**, one of the Philippine islands, between  $9^{\circ} 35'$  and  $11^{\circ}$  n., and  $123^{\circ}$  and  $123^{\circ} 50'$  e.; 140 m. long and from 4 to 25 wide. The surface is rough, and the soil not suited to agriculture, though there are fertile valleys producing cotton, sugar, rice, tobacco, and cocoa. The climate, though very hot, is salubrious.

**CEBUS** (Gr. an ape or monkey), a genus of American monkeys, characterized by a round head and short muzzle, a facial angle of about  $60^{\circ}$ , long thumbs, and a long prehensile tail entirely covered with hair. The species are numerous, all of very lively disposition and gregarious habits, living in trees. They feed chiefly on fruits, but also on insects, worms, and mollusks. They are included under the popular designation **SAPAJOU** in its wider sense, and some of them are the monkeys to which this name is sometimes more strictly appropriated. The names **SAJOU** and **SAI** are also given to some of them, and some are called Capuchin monkeys. One of the most common species in Guiana is the **WEEPER MONKEY**, or **WEEPER SAPAJOU** (*C. apella*).—The name capuchin is perhaps most frequently given to *C. capuchinus*, a brownish species, with head, feet, and hands generally black, and front, shoulders, and cheeks whitish. Some of the species of *C.* are adorned with beards.—The name *cebida* is sometimes given to the American monkeys collectively, as a family or tribe. See **MONKEY**.

**CEC'CO D'ASCOLI**, 1257-1327; the popular name of **FRANCESCO DEGLI STABILI**, a mediæval poet and encyclopædist. He studied mathematics and astrology, and was professor of the latter science in the university of Bologna. Having published a commentary on the sphere of John de Sacrobosco, in which he propounded bold theories concerning the employment and agency of demons, the clerical party caused him to be condemned to certain fasts, prayers, and fines; but he eluded punishment by going to Florence. His free-thinking and plain-speaking, however, raised up many enemies; he had attacked Dante's *Commedia* and his fate was sealed; an old accusation of impiety was renewed, and he was tried, sentenced, and burnt at the stake in Florence, in the 70th year of his age.

**CECIDOMYIA** (Gr. *kekidion*, a gall-nut; and *myia*, a fly or gnat), a genus of dipterous (two-winged) insects of the family *tipularia*—the gnat and mosquito family; having downy wings, which have three nervures, and are horizontal when at rest; antennæ as long as the body, with bead-like joints and whirls of hairs at the joints; long legs, and the first joint of the tarsi very short. The species are numerous; nearly thirty are British. All are of small size, but some of them are very important on account of the ravages which their maggots effect in grain-crops. *C. cerealis*, sometimes called the barley midge, a brownish-red fly with silvery wings, of which the maggot is vermilion-colored, is often very destructive to crops of barley and spelt in Germany. The little maggots live in families between the stalk and the sheath of the leaf, abstracting the juice of the plant.—The **WHEAT-FLY** (q. v.) and the **Hessian FLY** (q. v.) belong to this genus.—Some of the species of *C.* deposit their eggs on the young buds of trees, which the larvæ transform into galls.

**CECIL**, a co. in n.e. Maryland, on the Delaware and Pennsylvania border, intersected by three railroads; 375 sq. m.; pop. '90, 25,851, inclu. colored. It has an uneven surface and fertile soil, its products are wheat, corn, oats, potatoes, hay, butter, and wool. Of stone and minerals there are granite, gneiss, slate, iron, chrome, and sulphate of magnesia. There are flouring mills, and several other manufactories. Co. seat, Elkton.

**CECIL, RICHARD**, 1748-1810; a minister of the church of England, celebrated as a pulpit orator. His works have been published in England and in New York. They are prized for deep spiritual fervor. *Memoir* by his widow.

**CECIL, ROBERT**, Earl of SALISBURY, son of WILLIAM, was b. about 1550. On the death of his father, having previously held important state offices, he succeeded to what would now be called the premiership. On the accession of James I., C., who had carried on a private correspondence with that monarch before Elizabeth's death, was confirmed in his office and received many high honors, culminating in that of earl of Salisbury. In 1608, he was made lord high treasurer, and the exchequer was greatly improved in his hands. C. was a man of immense energy and far-reaching sagacity, undoubtedly the best minister the country had in his time; but he was cold, selfish, and unscrupulous as to the means he took to gain his ends, and get rid of his rivals. His connection with the disgrace of Essex and Raleigh laid him open to great and deserved odium, in

the latter case especially. He died May 24, 1612.

**CECIL, ROBERT ARTHUR TALBOT GASCOIGNE.** See **SALISBURY, R.A.T.G., MARQUIS OF.**

**CECIL, WILLIAM, LORD BURLEIGH**, one of England's greatest statesmen, was b. at Bourne, Lincolnshire, Sept. 15, 1520. Educated at the grammar-schools of Grantham and Stamford, he thence passed to St. John's college, Cambridge, where he was remarkable alike for his diligence and aptitude in learning. Entering Gray's inn at the age of 21, he devoted himself assiduously to the study of law. History, genealogy, and theology also formed part of his studies at this time; and his knowledge of the last recommended him to the notice of Henry VIII., who presented him with the reversion of the *custos brevium*, an office of value in the common pleas. An alliance with the daughter of sir Anthony Cook procured him the friendship of the protector Somerset, who, in 1547, appointed him master of requests; and in the following year his great talents procured for him the office of secretary of state. He shared in the disgrace of Somerset, even to imprisonment for three months; but in less than two years after his release, his pre-eminent abilities secured for him a reappointment to the state secretaryship by the duke of Northumberland, his former patron's sworn enemy. During his second secretaryship, C. effected most important and beneficial changes in the commercial policy of the country. With a sagacity far beyond the spirit of his age, he endeavored to throw trade open, and did succeed in abolishing some monopolies; but others proved too strong for him, standing as he did alone, at a time when exclusive privileges were considered the only sureties of a profitable trade. When queen Mary ascended the throne, C., being a Protestant, resigned his official employment, because he could not conscientiously serve a Roman Catholic court; but as a private gentleman he maintained good relations with the Roman Catholic party, and was one of the few eminent Protestants who escaped in purse and person during that short but infamous reign. His freedom from persecution has given rise to the charge, that he was a "trimmer"—a very unjust accusation, indeed. C. was naturally cautious and politic, and averse to extremes in religion; but though he took no part in bitter sectarian discussions, he never belied his conscience, and to him is mainly owing the rejection of the bill which the Roman Catholics had introduced into parliament, with the view to a wholesale confiscation of the estates of Protestants. Prior to Mary's death, C., foreseeing her end, had entered into correspondence with Elizabeth, who, on her accession to the throne (Nov. 16, 1558), at once recognizing C.'s capacity for government, appointed him secretary of state. A biography of C. from this time until his death would be a forty years' history of England, for he was alike the originator and director of that policy which, hitherto, has made Elizabeth's reign memorable above that of any other English sovereign; for although Elizabeth occasionally, in her caprice, favored other courtiers, C. was the statesman whose judgment she relied on in all matters of consequence. His policy at home and abroad was at once shrewd and cautious, and also liberal and comprehensive, while he displayed a power of decision, ready and stern, when necessity demanded. As a statesman, C. was above animosities and favoritism; his enemies never suffered, and his friends profited nothing, by his power. Capacity, truth, and honor were what he sought in public men. Had he been less just, history might have been more generous to his memory. The queen created him baron Burleigh, knight of the garter, and lord high treasurer. He died Aug. 15, 1598.

**CECILIA, St.**, the patroness of music, is said to have suffered martyrdom in 290 A.D. Her heathen parents, as we are told, belonged to a noble Roman family, and betrothed their daughter, who had been converted to Christianity, to a heathen youth named Valerian. This youth and his brother Tiberius became Christian converts, and suffered martyrdom. C., when commanded to sacrifice to idols, firmly refused, and was condemned to death. Her persecutors, it is said, first threw her into a boiling bath, but on the following day they found her unhurt. The executioner next attempted to cut off her head, but found it impossible. Three days later, she died—rather an odd conclusion to such miraculous interference. As early as the 5th c., there is mention of a church dedicated to her at Rome; and in 821, by order of pope Paschal, her bones were deposited there. St. C. is regarded as the inventor of the organ, and in the Roman Catholic church her festival-day, Nov. 22, is celebrated with splendid music. Chaucer, Dryden, and Pope have celebrated St. C., and the painters Raphael, Domenichino, Dolce, and others have represented her in fine pictures.—Another St. C. was born in Africa, and suffered martyrdom by starvation under Diocletian. The Roman Catholic church celebrates her festival on the 11th of Feb.

**CECROPIA**, a genus of trees of the natural order *artocarpacea*. *C. peltata*, a native of the West Indies and of South America, sometimes called trumpet-wood and snake-wood, is remarkable for its hollow stem and branches, exhibiting merely membranous partitions at the nodes. The small branches, these partitions being removed, are made into wind-instruments. The wood is very light, readily takes fire by friction against a harder piece of wood, and is much used by the Indians for procuring fire in this way. The fruit is agreeable, and resembles a raspberry. Both the trunk and branches yield a large quantity of saline matter, which is employed by the French planters in the

purification of sugar. The bark is strong and fibrous, and is much used for cordage. It is also astringent, and is applied in diarrhea and other diseases.

**CECROPIA MOTH**, *Platysamia cecropia*, the largest moth of the United States; belonging to the family bembycidæ, it is akin to the silk-worm. Its larva grows to be between 3 and 4 in. long, and is a most beautiful object; its color is a tender green, shading into blue upon its sides; on its head it wears an amber-colored knob raised upon a short stem, and armed with short black points; rows of smaller knobs adorn the back and sides, those along the sides being turquoise blue; the foremost four on the back are amber-colored. The larva feeds upon nearly all kinds of fruit trees, the maple, willow, and some other trees. It spins a large cocoon, sometimes attached to the under-side of a twig, when it is closely woven and tapers to a point at each end; sometimes in the space between forking limbs, when it is loosely made, and is often as large as a goose-egg. The outer and inner surfaces of the cocoon are somewhat condensed, so that there appear to be two cocoons or coverings. In the earlier stages of the spinning, the insect often thrusts the silk in loops through the openings between the threads, and these loops make it difficult to reel the silk; by dissolving in an alkali the gum which the insect exudes to harden the cocoon, and by using great care, it is possible to reel the silk, but it is dark and coarse, and would be fit for only coarse and strong fabrics. It has been carded and spun. The larva does not thrive in confinement, but might be cultivated in the open air with a little pains. The moth appears in June; its wings expand from 5 to 7 in.; its general color is dark brown thickly powdered with gray; the borders of the wings are clay-colored, and each wing bears a light gray kidney-shaped spot, bordered with lines of red and black. The antennæ of the males are particularly large and fine, the main stem being feathered on each side with long branches in pairs. Like other lepidopterous larvæ, the cecropia is preyed upon by various parasites, two species of ichneumon flies being notable.

**CECROPS**, the first king of Attica, figures in Greek mythology as an autochthon (q.v.), half-man and half-dragon. Belonging, as he does, to the prehistoric ages of Greece, his real character can only be guessed at. Tradition declared him to be the founder of marriage, the author of the political division of Attica into twelve states, and the introducer of agriculture, of navigation, and commerce. He is also said to have civilized the religious rites of the people. The name C. is given to various towns in Greece, and the legends in general seem to indicate a Pelasgic origin for the hero. The later accounts, that he came from Sais in Egypt, have no historic basis.

**CEDAR**, a co. in e. Iowa, watered by Cedar and Wapsipinicon rivers, and intersected by the Chicago, Rock Island and Pacific, and the Chicago and Northwestern railroads; 576 sq.m.; pop. '90, 18,253. The surface is divided between woodland and prairie; the productions are mostly agricultural. Co. seat, Tipton.

**CEDAR**, a co. in s.w. Missouri, on Sac river; 496 sq.m.; pop. '90, 15,620, incl. colored. The surface is uneven, but the soil is productive. Agriculture is the chief business. Co. seat, Stockton.

**CEDAR**, a co. in n.e. Nebraska, on the Missouri river, watered chiefly by Bow creek; 735 sq.m.; pop. 1890, 7028. It is an agricultural region. Co. seat, Hartington.

**CEDAR, BARBADOES**, *Cedrela odorata*, a tree of the natural order *cedrelaceæ* (q.v.), and of the same genus with the toon of India, a native of the West Indies and warm parts of America. It is simply called C. in the West Indies. It is often upwards of 80 ft. high, with a trunk remarkable for thickness. It has panicles of flowers resembling those of the hyacinth. The fruit, bark, and leaves have the smell of asafœtida, but the wood has an agreeable fragrance. Being soft and light, it is used for canoes, and for shingles. Havana cigar-boxes are very generally made of it. In France, it is used in making black-lead pencils.

**CEDAR, or CEDAR OF LEBANON**, a tree much celebrated from the most ancient times for its beauty, its magnificence, and its longevity, as well as for the excellence and durability of its timber. It is often mentioned in Scripture; it supplied the wood-work of Solomon's temple; and in the poetry of the Old Testament it is a frequent emblem of prosperity, strength, and stability. It belongs to the natural order *conifera*, and is the *pinus cedrus* of the older botanists; but is now ranked in the genus *abies* (see FIR), in the genus *larix* (see LARCH), by those who make *larix* a distinct genus from *abies*, or is made the type of a genus, *cedrus*, distinguished from *larix* by evergreen leaves and carpels separating from the axis, and receives the name of *C. libani*.

Of the celebrated CEDARS OF LEBANON, only a few now remain. They consist of a grove of some 400 trees, about three quarters of a mile in circumference, partly old trees and partly young ones. Learned travelers think that most of the trees in the grove may be 200 years old, and several between the ages of 400 and 800 years. There are 12 trees whose age is incalculable—seven standing very near each other; three more a little further on, nearly in a line with them; and two, not observed by any recent traveler except lord Lindsay, on the northern edge of the grove. The largest of these two is 63 ft. in circumference—following the sinuosities of the bark; one of the others measures 49 ft. See illus., CONIFERÆ, vol. IV.

These trees are more remarkable for girth than stature, their height hardly exceeding

50 feet. Their age is variously estimated; the rules by which botanists determine the age of trees are not applicable to them, for their stems have ceased to grow in regular concentric rings; they owe their prolonged existence to the superior vitality of a portion of their bark, which has survived the decay of the rest. Russeger is inclined to admit that these trees may possibly number some 2,000 years.

The Arabs, of all creeds, have a traditional veneration for these trees; they believe that an evil fate would surely overtake any one who shall dare to lay sacrilegious hands on the *saints*, as they fondly call them. Every year, at the feast of the transfiguration, the Maronites, Greeks, and Armenians mount to the cedars, and celebrate mass on a homely altar of stone at their feet.

The C. has been planted in parks in many parts of Europe; it was introduced into England in the latter part of the 17th c., and a tree at Sion house, London, is now 8 ft. in diameter at 3 ft. above the ground. Even in Inverness-shire it succeeds so well, that trees at Beaufort castle, the seat of lord Lovat, planted in 1788, are now 3 or 4 ft. in diameter. On its native mountains, the C. is found at the base of the highest peaks, at an altitude of about 8,000 ft. above the sea. It seems to delight in a dry open soil, where, however, its roots can have access to abundance of water. Although in foliage and some other particulars the C. considerably resembles the common larch, it differs in form and habit very widely both from the larch and from the pines in general. Its stem bears almost down to the ground irregularly placed branches, often of prodigious size and expanse, which divide irregularly into branchlets. The leaves are dark green, 10 to 15 lines long, pointed, united in clusters of 20 to 30: on the young shoots they are very numerous, and not in clusters; the small branchlets also are crowded together and pensive. The cones are erect, oval, broadly rounded at both ends, about 4 in. long, and 3 in. in diameter; their scales closely crowded, large, and broad. The cones take two years to come to maturity, and hang on the tree for years before their scales come off and their seeds are set free. The wood of the trunk is reddish, and full of a fragrant resin. The ancients kept their writings in cabinets or boxes of cedar-wood. Extraordinary indestructibility and other virtues were ascribed to it. It is not nearly so much prized at the present day, because it is soft and light, and apt to crack in drying. This inferiority is, however, not improbably owing to the inferior age of the trees from which the timber is now procured. A resinous substance, called *cedar resin*, or *cedria*, flows spontaneously from the trunk of the C., or from incisions; it resembles mastic, and was anciently used, along with other resins, in the embalming of the dead. It was also used as a medicine. In very ancient times, C. OIL, a kind of turpentine, was prepared from the wood, and was spread on books in order to their better preservation. At the present day, the oil and the resin are scarcely known. The branches of the C., like those of the larch in warm countries, exude a sweet substance, which is known by the name of C. MANNA.—The DEODAR or HIMALAYAN C. (*cedrus deodara*), a tree held in great veneration by the Hindus, and of which the name is said to be properly *devadara*, and to signify *god-tree*, is common in the Himalaya mountains, at elevations of 7,000 to 12,000 ft., forming magnificent forests, and attaining a great size, a height sometimes of 150 ft., with a trunk 30 ft. or more in circumference, an ample head, and spreading branches. It is described as having cones somewhat larger than those of the C. of Lebanon, the scales of the cones falling off as soon as the seed is ripe, and as differing from the C. of Lebanon also in more pensive branches and longer leaves; but Dr. Hooker expresses a strong opinion that they will prove to be really the same species, as well as the C. of ALGIERS (*C. Atlantica* or *Africana*), which is found in the mountainous regions of the n. of Africa. The wood of the deodar is resinous, fragrant, compact, and very durable. It is susceptible of a high polish, and in its polished state has been compared to brown agate. Owing to the abundance of resin, laths of it burn like candles. Its turpentine is very fluid, and although coarse, is much used in India for medical purposes; and tar and pitch are obtained from the trunk. The deodar has now become very common as an ornamental tree in Britain, although few specimens have yet attained a very considerable size. On account of its extreme gracefulness when young, it is often planted in situations to which large trees are unsuitable, and is to be seen in many suburban parterres.—The name C. is often given to other coniferous trees besides the true cedars. Thus, the Siberian stone pine, or Cembra pine, is called the SIBERIAN C. (see PINE), and a species of fir (*abies religiosa*) is the RED C. of California (see FIR). A species of cypress (q.v.) is known as WHITE C., and another as the C. of GOA. Several of the trees which bear the name C. are species of juniper (q.v.), among which are the VIRGINIAN C., or RED C. of North America, and the BERMUDA C.—which yield the cedar-wood used for pencils—the SPANISH C. of the s. of Europe, etc. The name C. is even given to trees which have no resemblance to the true cedars, except in the resinous quality of the wood; thus the cedar-wood of Guiana is produced by *iceia altissima*, a tree of the natural order *amyridaceæ* (q.v.); the C. of the West Indies belongs to the natural order *cedrelaceæ*; and the name BASTARD C. is given in India to a tree of the natural order *byttneriaceæ* (q.v.).

**CEDAR BIRD.** See WAXWING.

**CEDAR CREEK**, a stream in Shenandoah co., Va., falling into the Shenandoah river. On this creek, Oct. 19, 1864, the confederates, under Gen. Early, surprised Sheri-

dan's (union) camp, during that officer's absence. The unionists were compelled to retreat. Gen. Sheridan, who was at Winchester when he heard of the disaster, hastened to the front, and, rallying his forces, in turn surprised the confederates who had stopped to plunder the union camp, recovered nearly all that had been lost, took 2,000 prisoners, and 50 pieces of artillery, and the next day cleared the valley of the Shenandoah of confederate troops. This brilliant achievement was the theme of T. Buchanan Read's stirring poem, *Sheridan's Ride*.

**CEDAR FALLS**, a city in Black Hawk co., Iowa, on Cedar river and the Illinois Central, the Burlington, Cedar Rapids and Northern, and the Chicago and Great Western railroads, 93 m. from Dubuque. It is a manufacturing place of importance, having good water-power, and a variety of mills, and has the State Normal School, a high school, public library, national bank, and daily, weekly, and monthly periodicals. Pop. 1890, 3459.

**CEDAR MOUNTAIN**, a hill in Culpeper co., Va., near which, Aug. 9, 1862, there was an engagement between the federal forces under Gen. Banks and the confederates led by Gen. Jackson. The confederates had the advantage and held the field, but two days later fell back towards Gordonville to join Gen. Lee. The reported losses were: on the union side, 1400 killed and wounded, and 400 prisoners; of the confederates, 1283 killed and wounded, and 31 missing.

**CEDAR MOUNTAINS**, a range of the Cape colony, parallel with the Atlantic, and nearly half way between it and the dividing ridge of the country. They form the height of land between the Oliphant on the w., and the Great Thorn, its principal tributary, on the e., varying in altitude from 1600 ft. to 5,000.

**CEDAR RAPIDS**, a city of Linn co., Ia., on the Cedar river, 79 miles s.w. of Dubuque. The Burlington, Cedar Rapids and Northern railroad here crosses the Chicago and Northwestern, and the city is also on divisions of the Chicago, Milwaukee and St. Paul and the Illinois Central railroads. The city, which lies in a rich dairy country, contains large wholesale houses and pork-packing establishments, and the rapids furnish water-power for the numerous manufactories and the large railroad machine shops. There are churches, national banks, a high school, Coe College (Presb.), St. Joseph's Academy of the Sacred Heart (Rom. Cath.), Y. M. C. A. hall and library, public and Masonic libraries, electric lights and street railroads, Holly system of waterworks, etc. A bridge crosses the river at this point. Population, 1880, 10,104; 1890, 18,020.

**CEDAR, or RED CEDAR, RIVER**, rises in s.e. Minnesota, and flows s. and s.e. through more than three-quarters of the breadth of Iowa, falling into the Iowa river about 20 m. e. of the Mississippi. The entire length is about 360 miles.

**CEDD, or CEDDA**, saint, d. 664; brother of saint Chad or Ceadda, with whom he is often confused. He was b. in Northumbria; brought up by bishop Aidan; Christianized Essex and other parts of England; was made bishop of the East Saxons; founded two monasteries, and was famed in Britain and Ireland for learning and sanctity.

**CEDILLA**. See DIACRITICAL MARKS.

**CEDRELA'CEÆ**, a natural order of exogenous plants, very nearly allied to *meliacæ* (q.v.), and chiefly distinguished by the winged seeds, numerous in each cell of the fruit, which is a capsule. The known species are few, all tropical or sub-tropical trees or shrubs, with pinnate leaves, most of them trees valuable for their timber. To this order belong mahogany, satin-wood, toon, Barbadoes cedar, the yellow-wood of New South Wales, etc. The barks of some species are febrifugal.

**CEDEON**, an extract of a bitter nature from a small tree growing in Central and South America. In those countries the bitter is thought to be a remedy for the bite of serpents, and a prophylactic against hydrophobia.

**CEFALU'**, a seaport in n. Sicily, 47 m. e.s.e. of Palermo; pop. 14,000. The new town, founded in 1131 by Roger I. of Sicily, is at the base of a steep promontory which overlooks the magnificent bay of Cefalu. The houses are well built, and the cathedral, begun in 1132, is distinguished for the beauty of its façade, with antique pillars and mosaics. There is a small but good harbor, and some trade in manna, oil, and sardines.

**CEGLIE**, a t. in southern Italy, province of Lecce, 18 m. n.e. of Taranto. Pop. about 14,000. It produces much grain, and has fine pastures.

**CEEGIN'**, a t. of Spain, in the province of Murcia, 37 m. w.n.w. of the city of that name. It has some spacious streets, with handsome buildings, and manufactures of paper, cloth, and pottery. Pop. about 10,000.

**CEILING** (Fr. *ciel*; Lat. *cælum*, heaven). This term seems to have been suggested by the use of arched coverings for churches, and even for rooms, which prevailed in the middle ages, and was not unknown to the Romans. Whether the term was further suggested by the habit of tinting ceilings of a blue color, and decorating them with stars, or whether that usage arose from the use of the term already introduced, is more doubtful. Arched ceilings among the Romans were known by the name *camera* or *camera*, the Greek origin of which seems to furnish an argument in favor of the view that the arch was known to the latter people. The camera was formed by semicircular beams of wood, at small distances from each other, over which was placed a coating of lath and

plaster. In later times, the cameræ were frequently lined with plates of glass; whence they were termed *vitrea*. But the ceilings most commonly in use amongst the Romans were flat, the beams, as in modern times, having been at first visible, and afterwards covered with planks and plaster. Sometimes hollow spaces were left between the planks, which were frequently covered with gold and ivory, or paintings. The oldest flat C. in existence is believed to be that of Peterborough cathedral. Like that at St. Alban's abbey, it is made of wood, and plastered over like a modern ceiling. Ceilings of churches, in the middle ages, were generally painted and gilded in the most brilliant manner; and many existing ceilings still exhibit the traces of early decoration of this kind. The older ceilings generally follow the line of the timbers of the roof, which, in the early English and decorated, are often arranged so as to give the shape of a barrel vault. In ceilings of this description there are seldom many ribs, often only a single one along the top. In the perpendicular style, the C. often consists of a series of flat surfaces or cants, formed on the timbers of the roof. Though sometimes altogether destitute of ornament, they are more frequently enriched with ribs, dividing them into square panels, with bosses (q.v.) or flowers at the intersections. Wooden ceilings are sometimes formed in imitation of stone-groining, with ribs and bosses, examples of which will be found at York, Winchester, and Lincoln. In the Elizabethan age, ceilings were generally of plaster, but they were ornamented with ribs having bosses or small pendants at the intersections. It is not unusual for the C. immediately over the altar, or the roodloft, to be richly ornamented, whilst the rest is plain.

**CELANDINE**, *Chelidonium*, a genus of plants of the natural order *papaveraceæ* (the poppy family), having a corolla of four petals, and a podlike capsule. The common C. (*C. majus*) is a perennial, with pinnate leaves, lobed leaflets, and yellow flowers in simple umbels, frequent under hedges, in waste places, etc., in Britain and most parts of Europe. It flowers from May to Sept. The root, stem, and leaves, when fresh, have a disagreeable smell, and are full of a yellow juice, which is very acrid, causing inflammation when applied to the skin. C. is sometimes used in medicine: it is a drastic purgative, and in large doses an active poison; in small doses it is said to act beneficially on the lymphatic system and on the organs of secretion, and to be useful in scrofulous diseases, disease of the mesenteric glands, etc. The fresh juice, applied externally to warts, corns, etc., removes them by stimulating them beyond what their languid vital powers can bear. Mixed with milk, it is applied to the eye for the cure of opacities of the cornea, but is a remedy that requires great caution in its use.

**CELANO, LAKE OF.** See FUCINO, LAKE OF.

**CELASTRA'CEE.** See SPINDLE-TREE.

**CELEBES**, a large island in the Eastern archipelago, e. of Borneo, between 5° 45' s. lat., 1° 45' n. lat., and 118°, 126° e. longitude. Area, 71,470 sq. miles. It is irregular in shape, and four peninsulas springing from a common root form the large bays of Gorontalo and Tolo, and the gulf of Boni. C. is covered with mountains and valleys: a chain running throughout it sends spurs into the peninsulas. Some are active volcanoes, and earthquakes are frequent. The peak of Bonthaim is 9,788 ft. high. The island has a rich soil and extensive pastures. The vegetable kingdom gives sago, cocoa-nuts, bread-fruit, coffee, tamarinds, bananas, oranges, pine-apples, maize, rice, tobacco, sugarcane, indigo, sandal-, sapan-, and ebony-wood. The animals include excellent horses, buffalo, cattle, wild swine, elands, goats, sheep, parrots, lories, birds of paradise, beautiful butterflies, wild bees, etc. The minerals are gold, iron, coal, and salt. The people spin and weave cottons. Population, of various races, was estimated at the end of 1804 to be 958,472, three-fourths of which consists of the native Malay tribes, the Buginese and the Macassars. The chief t. is Macassar, which names the strait between C. and Borneo. In Nov., 1874, a fire destroyed 774 houses of the town. C. was discovered by the Portuguese in the early part of the 16th c., the exact date being given by some authors as 1512. At that time the Macassars were the most powerful people in the island, having successfully defended themselves against the king of the Moluccas and the sultan of Ternate. In 1609 the English endeavored to gain a foothold. The Dutch arrived near the end of the 16th or the beginning of the 17th century. In 1611, the Dutch East India company obtained a monopoly of the trade on the island of Buton, and in 1618 an insurrection in Macassar gave them an opportunity of obtaining a definite settlement in Celebes. In 1660 the native kingdom was forcibly subjugated by the Dutch, with 33 ships, and 2,700 men. Six years later, the war began again, but was ended in 1667, and a treaty was signed by which the Dutch were recognized as protectors and mediators of the different states who were parties to the treaty. In 1683 the n.e. part of the island was conquered and put under the command of the governor of the Moluccas; and in 1824 the kingdom of Boni was reduced. Since that time there has been no important military event except the speedily suppressed insurrection in Boni in 1850. The island is very irregular in outline, and has been compared to a star-fish with its limbs torn away from the w. side. There are few rivers, and none are navigable for any considerable distance; but the lakes are numerous, and some of them large. The most important of these is the Tamp-arang-Labaya, or Tempe, in the s.e. section of the peninsula. It has a depth of 30 ft., and is richly stocked with fish. The scenery throughout the

island is varied and picturesque. There are wonderful gorges, chasms, and precipices, many of the latter 600 ft. high, and yet covered with a tapestry of vegetation. Much of the country is still covered with the primeval forest, which is traversed here and there by scarcely perceptible paths, or broken by occasional clearings or villages. The fauna of Celebes exhibits some specimens both of birds and of mammals peculiar to the island. The most remarkable of these are an ape found in but one other country, a small ox-like quadruped that inhabits the mountainous districts, and the pig-deer of the Malays. Neither the elephant, the tapir, the rhinoceros, nor any large beast of prey is represented. Rice, sago, maize and fruits are cultivated for domestic consumption; and coffee, sugar-cane, tobacco, cotton, nutmegs and cocoanuts, for export. Not much attention, however, has been given to agriculture, except where the Dutch influence and example are strong; and manufactures are few and crude. The women weave a tolerable cotton cloth. The houses are of wood and bamboo, and are usually very frail. The whole of Celebes is practically in the hands of the Dutch government, though but a comparatively small portion is under their direct administration, and many of the petty princes are permitted to manage their internal affairs much as they please. For administrative purposes there are three "residences," Celebes, Menado, and Ternate, the former two belonging solely to the island, while the third includes a large part of the Moluccas. The most important and interesting people in the island are those in the department of Macassar. They consist mainly of Macassars and Malays proper, of Endinese from the island of Flores, and immigrants from the neighboring kingdom of Wadjo. The foreign colonies are each under the management of a separate captain, and the Malays are under the care of a head priest. The Macassars belong to the Malay race; they are well built and muscular; with dark brown complexion, a broad and expansive face, black and sparkling eyes, high forehead, nose rather flat, large mouth, and black soft hair which they let fall over their shoulders. The women are sprightly, clever and amiable, and formerly brought large prices as slaves. The men are brave, ambitious, jealous, and revengeful, but not treacherous. Drunkenness is rare, but gambling and cock-fighting are passionately engaged in. Running "amok" was once so common that the Dutch dismissed the Macassar soldiers from their service to break up the evil. They take great pleasure in all bodily exercise. In religion they call themselves Mohammedans, but their worship is full of pagan superstitions; they worship animals and a divinity called Kareng Lové, who has power over their fortune and health. Their language, which belongs to the Malayo-Javanese group, is spoken by about 300,000; but it has a much smaller area than Buginese, which is the language of Boni. Their literature is poor, and consists mainly of romantic stories from the Malay, and religious treatises from the Arabic. Of their few original works the most important are the early histories of Goa, and some other states of the Celebes, and a collection of laws and maxims of the old princes and sages. In no part of their possessions, however, have the Dutch made more important transformations than in Minahassa, or the confederation of Manado. At the beginning of the century the people were still savages, and in almost continual warfare among themselves. About 1822, it was discovered that the soil of the mountain sides was very favorable for growing coffee; the cultivation was introduced, and a system established by which the native chiefs undertook the management of the plantation. The result has been not only to make one of the best coffee districts in the archipelago, but wonderfully to advance the civilization of the inhabitants. Missions and education have been successful; villages of handsome houses have grown up; the country is traversed by roads shaded by trees, and rivers have been bridged. The trade of the district is in a flourishing condition, and promises to become still more important. The coffee plant produces a fine kernel of transparent greenish-blue color, and brings a much higher price than that from Java. Besides other large district divisions, for the most part physically similar to those described, there is the district or state of Toradja, lying entirely inland, which is in possession of a wild pagan race, perhaps aboriginal. See *illus., JAVA, ETC.*

**CELERES**, a body-guard of 300 young men of the best Roman families, organized, according to tradition, by Romulus. Next to the king, their leader was the highest officer of the state. This position was held by Brutus when he expelled the Tarquins.

**CELERY**, *Apium*, a genus of plants of the natural order *umbellifera*, distinguished by a mere rudimentary calyx, roundish entire petals, very short styles, and roundish fruit. The common *C. (A. graveolens)* is found wild in Britain and most parts of Europe, in ditches, brooks, etc., especially near the sea and in saline soils. Its leaves are dark green and smooth, its petals involute at the tip. The wild plant, also called *SMALLAGE*, has a stem about 2 ft. high, a tapering slender root, a penetrating offensive odor, a bitterish acrid taste, and almost poisonous qualities. By cultivation, it is so much changed that its taste becomes agreeably sweetish and aromatic, whilst either the leaf-stalks much increase in thickness, or the root swells in a turnip-like manner. These parts, blanched, are much used as a salad, or to impart flavor to soups, etc., and sometimes as a boiled vegetable. They contain sugar, mucilage, starch, and a substance resembling manna-sugar, which acts as a stimulant, particularly on the urino-genital organs, so that a very free and frequent indulgence in the use of *C.* cannot, in ordinary circumstances, be altogether favorable to health. Two principal varieties of *C.* are cul-

tivated, that most common in America having long thick leaf-stalks, which are more or less tubular, sometimes almost solid, and, after blanching, either white or more or less tinged with red; whilst the other, called TURNIP-ROOTED C., or CELERIAC, is chiefly remarkable for its swollen turnip-like root, and is in most general cultivation on the continent of Europe. The "red" varieties of C. are esteemed rather more hardy than the "white." The blanching of the leaf-stalks is generally accomplished by drawing up earth to the plants, which are transplanted from the seed-bed into richly manured trenches; and as they grow, the trenches are filled up, and the earth finally raised into ridges, above which little more than the tops of the leaves appear. C. is thus obtained for use throughout the winter. In the northern parts of Britain, the seed is generally sown on a hot-bed. C. seed is often used for flavoring, when the leaf-stalks cannot be obtained.—Another species of C. (*apium australe*) grows abundantly in wet places on the shore about Cape Horn and in Staten Island. It is a large, hardy, and luxuriant plant.

**CELESTE, MADAME**, b. 1814; a dancer and melodramatic actress of French descent, and a pupil of the Paris conservatory. She came to the United States about 1829, and not long after married a man named Elliot. After his death she went to England, and in 1830 began a career of remarkable success in the sensational drama of *The French Spy*. She made two other American tours, 1851 and in 1865. In 1866, she returned to England and retired from the stage. She d. 1862.

**CELESTIAL EMPIRE**. See CHINA.

**CELESTINE**, a mineral bearing the same relation to strontia (q.v.) that heavy spar bears to baryta. It is essentially sulphate of strontia  $\text{StOSO}_4$ , with occasional admixture of sulphate of baryta, carbonate of lime, oxide of iron, etc., in small proportions. It much resembles heavy spar, but is not quite equal to it in specific gravity; is usually blue, often of a very beautiful indigo-blue; sometimes colorless, more rarely reddish or yellowish. Its crystallization is rhombic, like that of heavy spar. Most beautiful specimens of crystallized C. are found in Sicily. C. derives its name from its color. It is used as a source of strontia.

**CELESTINE**, the name of five popes. 1. SAINT CELESTINE, d. 432, is supposed to have been a near relative of the emperor Valentinian. He held the council of Ephesus in 431, at which the Nestorians were condemned; actively persecuted the Pelagians; struggled for Roman orthodoxy; sent Palladius to Scotland, and Patricius (St. Patrick) to Ireland; raged against the Novatians in Rome, imprisoning their bishop, and forbidding their worship, and was intolerant of the least innovation of the constitutions of his predecessors. His papacy lasted nearly 8½ years. 2. GUIDO DI CASTELLO, chosen in 1143; d. 1144, after a reign of 5 months and 13 days. He gave absolution to Louis VII. of France, on the king's humble subjection, and removed the papal interdict from that country. 3. GIACINTO BOBONE ORSINI, elected Mar. 30, 1191; d. 1198, after ruling nearly 9 years, and was buried in the Lateran; supposed to have been 90 years old when chosen. He crowned the emperor Henry VI. of Germany, and subsequently excommunicated him for keeping Richard I. of England in prison. In 1193, he confirmed the statutes of the Teutonic order of knights. 4. GOFFREDO CASTIGLIONE of Milan, a nephew of Urban III. He was elected pope by only seven cardinals, Sept. 22, 1241, and occupied the chair only 17 days, dying Oct. 8, before he was consecrated. He was the author of a history of Scotland, in which country he was once a monk. 5. PIETRO DA MORONE, the son of a peasant of Naples; became a Benedictine monk, and lived many years in caves after the manner of John the Baptist. Terrible stories are told of the severity of his penitential discipline. During his hermit life he founded the order that bears his name (see CELESTINES). After the death of Nicholas IV. he was elected pope, but refused to accept until persuaded by a deputation of cardinals reinforced by the kings of Naples and Hungary. He was chosen July 7, 1294, was crowned Aug. 29. He issued two decrees; one confirming that of Gregory X. ordering the shutting up of the cardinals when in conclave, and one declaring the right of any pope to abdicate at pleasure—a right which, after ruling 5 months and 8 days, he exercised, Dec. 13, 1294. In his document of renunciation he assigned as the moving causes "the desire for humility, for a purer life, for a stainless conscience; the deficiencies of his own physical strength; his ignorance, the perverseness of the people, and his longing for the tranquillity of his former life." Having divested himself of every outward symbol of dignity, he returned to his old solitude; but he was not permitted to remain; his successor, Boniface VIII., sent for him, and, despite his efforts to escape, imprisoned him in a castle, where, after languishing ten months in the infected atmosphere, he died, May 19, 1306. He, like the first of the name, is recognized as a saint by the Roman church.

**CELESTINES**, an order of hermits of St. Damianus, founded by Peter de Morrone about 1264, and confirmed as a monkish order by Urban IV. in 1264 and 1274. They called themselves C. when their founder ascended the papal chair under the name of Celestine V. They are regarded as a branch of the great order of St. Benedict, whose rule they follow; they wear a white garment with black hood and scapulary, and live a purely contemplative life. In the 13th and 14th centuries, the order rapidly spread through France, Italy, and Germany, but subsequently decayed. The French C. were



secularized by order of Pope Pius VI. in 1776-78; so also were the Neapolitan Celestines. In the present day, the order is almost extinct.

**CELIBACY**, from Lat. *celes*, unmarried. Notwithstanding the divine commendation of marriage given in the Jewish Scriptures (Gen. i. 28), the opinion had become prevalent, even before the time of Christ, that C. was favorable to an intimate union with God. This notion took its origin in the wide-spread philosophy of a good and an evil principle. The body, consisting of matter, the seat of evil, was looked upon as the prison of the pure soul, which was thought to be defiled by bodily enjoyments. Among the Jewish sect of the Essenes, accordingly, a life of C. was held to be the chief road to sanctity. These ascetic views naturally led, in the first place, to the disapproval of second marriages. While, therefore, in the first Christian churches, every one was left at liberty to marry or not as he thought fit, the objection to those who married a second time had become so generally spread, that the apostle Paul saw occasion to counsel such Christian converts as were in widowhood to remain so.

By the 2d c., however, the unmarried life generally had begun to be extolled, and to be held necessary for a life of sanctity, although several, at least, of the apostles themselves had been married. Two passages of Scripture (1 Cor. vii. and Rev. xiv. 4) were specially cited as proving that C. was the genuine condition of a Christian; and with the platonizing fathers of the 2d and 3d centuries, the unmarried of both sexes were held as standing higher than the married. Accordingly, although there was no express law against the marriage of the clergy, many, especially of the bishops, remained unmarried; a second marriage was, in their case, already strictly prohibited.

As the bishops of Rome rose in consideration, and gradually developed a firmer church government, they called upon all who belonged to the clerical order to live for the church alone, and not marry. This requirement met with constant resistance; still, it became more and more the custom, in the 4th c., for the higher clergy to refrain from marriage, and from them it went over to the lower orders and to the monks. Provincial synods now began expressly to interdict the clergy from marrying. The council of Tours (566) suspended for a year all secular priests and deacons who were found with their wives; and the emperor Justinian by an edict declared all children born to a clergyman, after ordination, to be illegitimate, and incapable of inheritance. There were still, however, many married priests who resisted the law, and found encouragement in the opposition which the Greek church made to that of Rome in this matter of celibacy. The council held at Constantinople in 692, declared, in opposition to the church of Rome, that priests and deacons might live with their wives as the laity do, according to the ancient custom and ordinance of the apostles. The orthodox Greek church has continued to adhere to this decision. Priests and deacons in that church may marry before ordination, and live in marriage after it; but they are not allowed to marry a second time. However, only a priest living in C. can be chosen as bishop or patriarch.

The Church of Rome continued its endeavors to enforce the law of C.; though, for several centuries they were attended with only partial success. There still continued to be numbers of priests with wives, although the councils were always issuing new orders against them. Popes Leo IX. (1048-54) and Nicolas II. (1058-61) interdicted all priests that had wives or concubines from the exercise of any spiritual function, on pain of excommunication. Alexander II. (1061-78) decreed excommunication against all who should attend a mass celebrated by a priest having a wife or concubine. This decision was renewed by Gregory VII. in a council held at Rome in 1074, and a decretal was issued that every layman who should receive the communion from the hands of a married priest should be excommunicated, and that every priest who married or lived in concubinage, should be deposed. The decree met with the most violent opposition in all countries; but Gregory succeeded in carrying it out with the greatest rigor; and though individual instances of married priests were still to be found in the 12th and 13th centuries, the C. of the Roman Catholic clergy was established, and has since continued both in theory and practice.

The violence thus done to human nature did not fail to avenge itself in those rude times. The licentiousness and corruption of many of the priests became in many cases boundless, and it was in vain that strict individuals, as well as councils, strove against it. The alleged immorality of certain of the clergy became a reproach and by-word in the mouth of the people, and gave a powerful impulse to the religious movement that began in the 16th century. The leading reformers declared against the C. of the clergy as unfounded in Scripture, and contrary to the natural ordinance of God, and Luther set the example of marrying. This was not without effect on the Roman Catholic clergy, and the question of the abolition of C. was raised at the council of Trent (1563). But the majority of voices decided that God would not withhold the gift of chastity from those that rightly prayed for it, and the rule of C. was thus finally and for ever imposed on the ministers of the Roman Catholic church. Those who have only received the lower kinds of consecration may marry on resigning their office. For all grades above a sub-deacon, a papal dispensation is necessary. A priest that marries incurs excommunication, and is incapable of any spiritual function. If a married man wishes to become a priest, he receives consecration only on condition that he separate from his wife, and that she of her free will consent to the separation and enter a religious order, or take the

vow of chastity. The priests of the united Græco-Catholic congregations in Rome have received permission from the popes to continue in marriage, if entered into before consecration, but on condition of always living apart from their wives three days before they celebrate mass.

Notwithstanding these decisions, the contest against clerical C. has again and again been resumed, in recent times, both within and without the Roman Catholic church. In fact, all attempts at innovation within the bosom of Catholicism, connect themselves with the attack on C., the abolition of which would deeply affect the constitution and position of that church. So far back as 1817, the Catholic faculty of Tübingen expressed the opinion that compulsory C. was one of the chief causes of the want of Catholic ministers. In 1826, the Catholic clergy of Silesia put in petitions to the bishop for the abolition of C.; and unions were afterwards formed in Baden, Württemberg, Bavaria, Silesia, and Rhenish Prussia, which, along with alterations in the doctrines and ritual of the Romish church, combined attacks on the prohibition of marriage to the clergy. A work was also published, entitled *The Introduction of Compulsory Celibacy among the Christian Priesthood, and its Consequences* (Altenb. 1828, new ed. 1845), which excited great attention. At last the abolition of the law came to be discussed in the legislatures of Baden, Saxony, and other countries. The church claimed this subject as belonging exclusively to her jurisdiction, and not to that of the state; and in Württemberg the clergy induced the government to suppress the anti-celibacy society; but this only made their opponents in the press the more zealous. In France, also, the question, about 1829, was eagerly discussed. And in Spain, the academy of ecclesiastical science took the subject into consideration in a meeting held in 1842; while the Portuguese chambers had previously, in 1835, discussed it, though without result. The same took place in Brazil, about 1827.

During the commotions of 1848, the subject was again brought into prominence in Germany. The German Catholics (q.v.) had already abolished C.; and a general measure was called for in the Frankfort parliament, in the Prussian assembly, and in the press. In Austria, also, voices were raised against it; but here the state took the side of the pope, who, in a bull of 1847, had added fresh stringency to the rule of C., and condemned its infringement. See **BACHELOR, MARRIAGE**.

**CELL** (Lat. *cella*, from *celo*, to conceal). The Latin word had nearly all the significations which we attach to the English one, and a good many besides which we have not borrowed. For example, the whole space between the walls of an ancient temple was called the *cella*. But the interior was frequently divided into several cellæ, in which case each C. took the name of the deity whose statue it contained, and was called the C. of Jupiter, Juno, Minerva, and the like. In these cases, the word approached to its general meaning, which, with the Romans as with us, was that of a store room, or small apartment where objects of any kind were stowed away. In modern architecture, the term vaulting C. signifies the hollow space between the principal ribs of a vaulted roof.

**CELL**. See **GALVANIC BATTERY**; **ELECTRO-CHEMISTRY**.

**CELLARER**, a person under the Roman emperors who supervised the domestic affairs of the household and examined accounts. The same title was given in later times to the purveyors for monasteries or priests. As an officer of a monastery the C. regulated every matter affecting provisions.

**CELLE**, or **ZELL**, a t. of Hanover, on the left bank of the Aller, which at this point becomes navigable, 23 m. n.e. of the city of Hanover. It is situated in the midst of a sandy plain, well built, and has a gymnasium, library, and a palace with a garden, in which Matilda, sister of George III., is buried. Pop. '90, 18,901. The inhabitants are very industrious. The chief manufactures are linen, hosiery, tobacco, wafers, soap, etc.

**CELLINI**, **BENVENUTO**, a celebrated Italian gold-worker, sculptor, founder, and medallist, remarkable not only for his skill as an artist, but also for his checkered life, was b. at Florence in the year 1500, and first displayed skill as a chaser and gold-worker. His autobiography is a remarkably curious and interesting work, presenting us with a complete picture of the author's life and character; his activity, his extraordinary weaknesses, the impetuosity of his passions, the perilous circumstances in which his quarrelsome disposition placed him (for C. thought nothing of committing manslaughter in a moment of rage), and the ludicrous vanity and credulity which are never absent from him. The book is also of great value in a historico-social point of view, but does not impress us favorably in regard either to the personal or social morals of the time.

At an early period, having been banished from Florence in consequence of an "affray," C. went to Rome, where he was employed by many distinguished patrons of art, but afterwards was allowed to return to Florence. Another "affray" compelled him to flee to Rome a second time, where he secured the favor of Clement VII. C., by his own account, was as great in arms as in art; he declares that it was himself who killed the constable Bourbon and the prince of Orange at the siege of Rome. His reckless conduct for some years compelled his constant shifting between Rome and Florence, Mantua, and Naples. In 1587, he went to the court of France, where he was very honorably received. Illness, however, induced him to return yet once more to Rome, where he had the misfortune to be imprisoned on a charge of plundering the treasures in the

Castle of St. Angelo during the siege of Rome. At length he was liberated, through the intercession of the cardinal of Ferrara, for whom he executed, out of gratitude, a fine cup, and various other works. He now accompanied his deliverer to France, and entered the service of Francis I.; but having incurred the displeasure of the ruling favorite, Mme. d'Estampes, he returned to Florence—not, however, until, as usual, he had settled some matters with his “sword”—where, under the patronage of Cosmo de' Medici, he executed several fine works in metal and marble—among them, the celebrated bronze group of “Perseus with the Head of Medusa,” now in the market-place in Florence. Among other preserved works of C., the splendid shield in Windsor castle may be noticed. In his 58th year he began to write his autobiography, and died in 1570 or 1572. In 1876, a number of C.'s original papers were found. See Symonds' trans. of C.'s work (1887), and the monograph by Plon (1883).

**CELLS, in Physiology.**—I. **ANIMAL CELLS.**—On examining, under a high magnifying power, any of the constituents of the animal body, we perceive that the smallest parts which appear to the naked eye as fibers, tubes, etc., are not ultimate elements in respect to form (morphotic elements), but that they contain and are built up of certain extremely minute particles, which differ in different organs, but always have a similar appearance in the same organs. By far the most important of these microscopic forms, which are known by histologists as “simple elementary parts,” are the C., which not only form the starting-point of every animal and vegetable organism (the ovum in either kingdom of nature being simply a cell), but also—either as C., or after having undergone certain modifications which will be presently described—make up the tissues and organs of the perfect animal. Indeed, some of the lowest plants (red snow, gory dew), and of the simplest forms of animal life (Gregarinidæ, q. v., etc.), appear to consist of a single cell.

While in plants the elementary parts generally unite directly with one another, in animals they are usually combined by an interstitial substance, which may be either solid or fluid, and is always derived from the blood or general nutrient fluid. If this interstitial substance take a part in the formation of the C., it is called a cytotblastema or a blastema, from *kutos*, a cell or vesicle, and *blastema*, germ substance; if it has nothing to do with their maintenance, it is called the matrix. The cytotblastema is usually fluid, as in the blood, chyle, etc.; while the matrix is solid, as in cartilage, bone, etc.

In every cell, we can distinguish, if we use sufficiently high magnifying powers, a membranous envelope, known as the cell-wall or membrane, and certain contents. The latter are fluid or gelatinous, and besides containing particles or granules, usually exhibit a peculiar rounded body, the nucleus; which, again, contains in its interior a fluid and a still smaller corpuscle, the nucleolus.

The fundamental form of the cell is spherical or lenticular; it is such in all young C., and is persistent in those which occur in fluids, as, for example, the blood-corpuscles. Amongst other well-known forms may be mentioned: the polygonal, as in pavement epithelium, or the pigment of the eye; the conical or pyramidal, as in ciliated epithelium; the cylindrical, as in cylinder epithelium; the fusiform, or spindle-shaped, as in contractile fiber-cells; the squamous, as epidermic scales; and the caudate, polar, or stellate, as the C. in the gray nervous tissue.

With regard to size, the largest animal C.—excepting the unicellular organisms—are the yolk-cells of the ova of birds and amphibia, while the blood-cells of certain animals may be taken as representing the smallest cells. Average C. range from 0.005 to 0.01 of a line in diameter.

The cell-membrane is usually transparent and colorless, mostly smooth, and so thin as to exhibit only a single contour, rarely of any measurable thickness. No traces of structure can be detected in it. The granular appearance which the membrane occasionally presents, is due to projections depending on granules lying on the inside; and it vanishes on the addition of water, which causes the cell to be distended by endosmosis. See Osmose.

C. which contain only fluid are rare (fat-cell, blood-cell); generally, besides fluid, they contain elementary granules and vesicles, and sometimes crystals. As a general rule, the number of these morphotic elements increases with the age of the cell; sometimes, however, this is not apparent, in consequence of their being grouped in a single mass around the nucleus.

The nucleus is usually spherical or lenticular, transparent and either colorless or yellowish, and ranges from 0.002 to 0.004 of a line in diameter. All nuclei are vesicles, as was originally maintained, in 1841, by Schwann (*Microscopical Researches into the Accordance in the Structure and Growth of Animals and Plants*, Sydenham society's translation, 1847, p. 173), who must be regarded as the founder of the cell-theory in its relation to animal tissues, and as has since been confirmed by Kölliker and other later observers. The contents of the nucleus usually consist, with the exception of the nucleolus, of a limpid or slightly yellowish fluid, from which water and acetic acid precipitate granular matter. In general, only one nucleus exists in each cell, except when it is multiplying (a process which we shall presently explain); occasionally, however, we meet with several nuclei—four, ten, or even twenty.

The nucleolus is round, sharply defined, and often so small as to be almost immeasurable. Nucleoli are found in most nuclei so long as the latter are still young, and in many during their whole existence. As, however, nuclei exist in which no nucleolus

can be detected, we cannot regard the nucleolus as so essential an element of the cell as the nucleus. Most commonly a nucleus contains only one nucleolus; two are not unfrequently seen; more are rare.

Our knowledge of the chemical composition of C. is very imperfect. That the cell-membrane is a protein substance (q.v.)—at all events in young C.—is obvious from its solubility in acetic acid and in dilute caustic alkalies; and the membrane of the nucleolus seems to have a similar composition; while there are chemical reasons for believing that the nucleolus is composed of fat. In the contents of most C. we usually find such substances as occur in solution in the cytoblastema—viz., water, albumen, fat, extractive matters, and salts; and in the C. of secreting organs, as for instance, the liver and kidneys, we find the special secretions of those glands; in the blood-cells, we find hemato-crystalline, etc.

There are two perfectly distinct ways in which C. can be generated: they may be developed independently of other C. in a plastic fluid (the cytoblastema); or they may be developed from pre-existing C. by cell-multiplication, the existing C. either producing secondary C. within themselves, or multiplying by division. In both these latter kinds of cell-development, the nucleus seems to be the center of development of the young cells.

In order that free or independent cell-development shall take place, we must have a cytoblastema containing protein substances (probably fibrin), fat, and certain salts (especially phosphates) in solution; and very possibly the presence of the particles of pre-existing C. may also be necessary, in which case free cell-development ceases to exist. The chyle and lymph corpuscles may be mentioned as examples of this mode of cell-formation. The steps of the process are not very clearly made out, but we know that the nuclei are first formed, and that the cell-membranes are developed around them. Free cell-development is far less common in man and the higher animals than cell-multiplication, and, we believe, never occurs in the vegetable kingdom. All pathological cell-formations—the C. in pus (q.v.), and in other morbid exudations—come, however, under this head.

The development of C. within other C. is of very common occurrence. An original or parent cell produces two or more secondary or daughter C., and the process of formation is said to be endogenous. Cartilage-cells afford a good example of this process. The nucleus and the contents of each parent cell undergo division into two parts, so that the number of C. is successively doubled. The mode in which the multiplication of the nucleus takes place cannot be definitely made out in all cases, but when clear observation is possible, the nucleoli first divide into two, and then separate.

A multiplication of C. by division has been proved to take place in the red blood-cells of the embryos of birds and mammals, and in the first colorless blood-cell of the tadpole, and very probably occurs extensively in many embryonic and adult tissues, in which a self-multiplication of C. is certain, but where no parent C. with secondary C. can be detected. In this and similar cases we have an elongation of the cell, and the single nucleus becomes divided into two; the cell then suffers constriction in the middle, which proceeds till it finally separates into two parts, each of which contains a nucleus. This variety of cell-formation affords a good illustration of the doubt and difficulty connected with this class of investigations. It was altogether unknown to Schwann when he published his great work in 1839, and was first noticed and described by Remak in 1841, who, however, subsequently retracted his published view, and did not again advocate it till Kölliker confirmed his observation, and declared it to be correct.

No satisfactory theory has been propounded with the view of explaining the development of cells. Schwann compares the formation of C. with that of crystals, but it must be recollected that the molecular attraction concerned in the formation of C. is so far peculiar, that—1. It never produces geometrical solids, but even in the nucleus and nucleolus determines a globular form; 2. That it aggregates not homogeneous, but chemically different substances; and 3. That the final result of its action—namely, the cell—is extremely limited in size, while a crystal may be of a comparatively indefinite magnitude.

The growth of C. requires some notice. Growth probably occurs in all C., although not in all to the same extent. It is most obvious in those which are formed directly round a nucleus, since in these the membranes which at first closely invest the nucleus, in time become distended and enlarged, and merely remain in contact with the nucleus at one point. Growth may take place either in surface or in thickness. The former is most commonly general—viz., in all those cases where C. increase without altering their form; but is sometimes partial—viz., in those cases in which the cell deviates considerably from the primary globular form. The latter occurs to a certain degree in all C., but in some kinds to a far greater extent than in others. The nuclei and nucleoli also take part to a certain extent in the growth of the cells. Schwann gives the following general explanation of the process of growth. He considers that the molecules of the cell-membrane exert an attractive influence on the fluid which surrounds them, and deposit its newly formed particles amongst themselves. If the deposition take place between the molecules already present in the substance of the membrane, the cell

becomes distended; if it take place only in one or more definite directions, the membrane becomes thickened.

Having now traced the cell to the period of its full growth, we are prepared to consider the processes which occur in the anterior of this minute organic structure, or, in other words, the physiology of cells. To enter satisfactorily into this subject, we ought to have an exact knowledge of the chemical composition of the contents of different cells. All that we know of the contents of C. generally is, as we have already stated, that they usually consist of a moderately concentrated solution of protein matters, with alkaline and earthly salts, and dissolved or suspended fat-particles; and that besides these ingredients many C. contain either a great preponderance of one of these constituents, to the almost entire exclusion of others, or are found to contain altogether new substances. Thus, there are C. with much protein matters, as the nerve-cells, and with much fat, like the fat-cells; while there are other cells which specially contain hæmatine (the red coloring matter of the blood), pigment, biliary and urinary constituents, mucus, milk, sugar, etc.

The main cell-processes occurring in these variously constituted C. are absorption, secretion, and excretion. These depend principally, if not entirely, upon chemical and physical laws, and are to a great extent amenable to micro-chemical observation.

Absorption, or the appropriation of matters from without, is most manifest to those C. which at first have little or no contents save the nucleus. Although endosmoses must be taken into account as a condition of absorption, C. must not be regarded merely as vesicles provided with indifferent porous membranes; for the filling of C. does not take place by their admitting every kind of matter indiscriminately; but they have the power of taking up one constituent, and rejecting another, and thus exhibit a selective faculty.

The cell having thus become filled from without, we have next to inquire into the changes which take place in the membrane and in the contents. As regards the former, the membranes of most C. not only become denser and more solid with age, but they undergo changes in their chemical constitution. Thus, in the horny tissues, the young C. are easily soluble in alkalis and acids, while older C. of the same nature are scarcely affected by these re-agents; again, in cartilage C., the membrane not only becomes firmer with age, and thickens as ossification proceeds, but is changed into a tissue yielding gelatine or glue on boiling, which subsequently becomes impregnated with salts of lime (phosphate and carbonate). See BONE.

The function of secretion is mainly carried on by changes in the contents of the C. Thus, mucous is formed in the epithelial C. of the mucous membranes, pepsin in those of the gastric glands, bile in the C. of the liver, and sepia in the C. of the ink-bag of the cuttle-fish. In these cases, the C. do not separate mucus, pepsin, etc., from the blood, but merely the materials from which they elaborate these substances. In other cases, as, for instance, in the C. of the kidney, the function of these minute organisms is not to manufacture new products, but merely to separate certain substances (urea, uric acid, etc.) from the blood, which, if not immediately removed from the general circulation, would speedily accumulate, and act as a deadly poison. That these C. merely separate the urea from the blood, and do not form it in their interior, is proved by the fact that, if the kidneys of an animal are extirpated, the urea and other urinary constituents may speedily be found in large quantity in the blood.

Excretion takes place by the bursting or solution of the distended secreting cell, usually into the duct of a secreting gland. The reader who desires further information on the functions of the C. in relation to secretion and excretion, is especially referred to an admirable memoir by prof. Goodsir, "On Secreting Structures," published in John and Harry D. S. Goodsir's *Anatomical and Pathological Researches*, 1845.

In conclusion, we must notice the metamorphoses of C. The ovum itself is, as we have already mentioned, merely a nucleated cell; after impregnation, a number of secondary C. are formed within it, by a process of cleavage or segmentation. See GENERATION; REPRODUCTION. Some of the C. which occur in the ovum in its early stages soon coalesce with others to form the higher elementary parts, which we shall shortly enumerate; others, without entering into combinations, more or less change their previous nature, as the horny plates of the epidermis and nails; while others, again, undergo no change of form throughout the period of their existence.

The permanent C. are arranged by Kölliker (*Manual of Human Histology*, translated by Busk and Huxley, 1853, vol. i. p. 47) under the following heads:

1. *True Cells*, which have in no essential respect altered their cellular character. These occur in the epidermis and the epithelium; in the blood, chyle, and lymph; in the glandular secretions, in the fatty tissue, in the gray nervous substance, in the glands (liver, spleen, etc.), and the cartilages. Their varieties of form and contents have been already noticed. Regarding their modes of occurrence, some are either isolated in fluids or in solid tissues; others are united by apposition, without any intervening structure, into a cellular parenchyma; while others, again, are conjoined by an intercellular substance of some kind.

2. *Metamorphosed Cells*. To these belong—the *horny scales*: flattened, polygonal, or fusiform; their membrane being fused into one mass with their contents. They occur in the epidermis, the laminated pavement epithelium, and the hair and nails. *The con-*

*tractile fiber C.*: fusiform, slightly flattened, considerably elongated C., whose membrane, with its soft, solid contents, is changed into a contractile substance. They occur in the smooth or involuntary muscles. *The tubules of the crystalline lens of the eye*: very elongated C., with viscid, albuminous contents. *The prisms of the enamel of the teeth*: greatly elongated, prismatic, and strongly calcified cells. *The bone C.*: thickened C. (with *canaliculi*, or minute branching canals) which have coalesced with the matrix of the bones. *The transversely striated muscular C.*: large polygonal C. whose contents have become metamorphosed into a transversely striated or striped tissue, such as is found in voluntary muscular fiber. From these C. are formed all the different fibers, net-works, membranes, tubes, etc.; in short, all the higher elementary parts of which the animal body is composed.

For further information on C. and cell-development, the reader is referred, in addition to the works quoted in this article, to Leydig, *Lehrbuch der Histologie des Menschen und der Thiere*, 1857; and to Frey, *Histologie und Histochemie des Menschen*, 1859 (translated by Barker, 1874). He will find full details on morbid cell-development (the growth of C. in tubercle, cancer, and other morbid deposits) in Vogel's *Pathological Anatomy of the Human Body*, translated by Day, 1847; and in McKendrick *On the Modern Cell-theory* (1888).

**II. VEGETABLE CELLS.**—In the vegetable, as in the animal kingdom, the primary form of the cell is that of a sphere. There are, however, interfering influences, which usually alter or modify the primary form, of which the most important are, (1.) Special directions assumed in the development, in obedience to a law regulating the structure of the tissue in which the cell occurs; and (2.) Obstructions to the expansion of the cell in certain directions from the pressure of surrounding cells.

The most common forms referable to the law of development are, (1.) The *spherical* or *fundamental* form; (2.) The *cylindrical*, in which there is a tendency to elongation in the direction of a vertical axis; and (3.) The *tubular*, in which there is an excess of development in the direction of the two transverse axes.

The secondary modifications of these forms are numerous. Thus, in lax tissues, the spherical form may become an irregular spheroid, running out into *lobed*, and even *stellate* forms, as may be seen in the pith of rushes and the stems of various aquatic plants. Again, in seeds, the hard part of fruits, etc., the mutual pressure of the C. converts the spherical into *polyhedral* forms, of which the *dodecahedron*—giving a hexagonal section, and arising from equal pressure in all directions—is the most common, although *cube* and many other forms occasionally occur.

The magnitude of the vegetable C. is very varied. In flax, the liber-cells have been found  $\frac{1}{4}$ , or even  $\frac{1}{3}$  of an inch in length, and the cylindrical C. of some of the coniferæ are more than an inch long—although their transverse diameter is very minute—whilst, on the other hand, the spores of fungi are C. of a diameter of  $\frac{1}{1000}$  of an inch. The average diameter of the C. in the parenchymatous tissues is about  $\frac{1}{100}$  of an inch.

Both the cell-wall and the contents differ from the corresponding parts in animal cells. In all young C. the wall is membranous, freely permeable by water, elastic, and flexible. In many cases it retains these properties, whilst in others it becomes much modified, as the cell grows older. It consists mainly of cellulose (q.v.). As the vital and chemical phenomena exhibited by plants depend primarily upon operations in the interior of the cell, the careful study of the cell contents is of the highest importance. Of these contents, the most important are the *primordial utricle*, with the *protoplasm*, the *nucleus*, *chlorophyll corpuscles*, and *starch granules*.

The primordial utricle is a layer of substance of mucilaginous consistence (colored yellow by iodine), lining the entire wall of the young cell, but often disappearing at a comparatively early period. The protoplasm is a tough mucilaginous and frequently granular fluid, which fills up the space in the interior of the cell not occupied by the nucleus. The nucleus or cytoblast is a globular or lenticular body, identical in its character with the substance of the primordial utricle, and occurring in the protoplasm of most young cells. Little is known with certainty regarding the chlorophyll corpuscles, except that, under the influence of solar light, green coloring matter is developed from them. Of the starch granules, which are very commonly found in the cell contents, we need not speak, as they are sufficiently described in the article STARCH.

In addition to the above organized structures, we must mention as frequent constituents of the cell-contents, fluid coloring matters, essential and fixed oils, resins, sugar, dextrine, gum, alkaloids, and mineral or organic salts, which are not unfrequently found in a crystalline form, when they are termed raphides.

There are two modes of cell-development in the vegetable kingdom—viz., (1) *Cell-division*, where two or more new cells fill the cavity of the parent cell, and adhere to its membranes, appearing to divide it into compartments; and (2) *Free cell-formation*—not to be confounded with a process of the same name which is supposed to occur in the animal kingdom—in which the whole or part of the cell-contents become detached from the cell-wall and resolved into new loose C., which ultimately escape from the parent cell. The former mode universally occurs in the formation of the C. by which growth is effected; the latter occurs only in the production of C. connected with reproduction. For further information, we must refer the reader to Von Mohl's *Principles of the Anatomy and Physiology of the Vegetable Cell* (1852), and Schenck's *Handbuch der Botanik* (1889).

**CELLULAR RES.** in botany, a designation applied to those plants which consist entirely of *cellular tissue* (q.v.), without proper vessels of any kind. C., thus defined, are a subclass of acotyledonous plants, containing the orders of *lichens*, *fungi*, and *algæ*. In the system of De Candolle, however, the name C. was given to the second grand division of plants, the first being called *vasculares*, and the distinction between them being the presence or absence of vessels, the C. including all acotyledonous or cryptogamous plants. But ferns and mosses are not destitute of vessels; so that this system is not strictly accurate with regard to them: whilst, as all vessels are now known to be formed by the elongation and union of cells, the distinction between vascular and cellular tissue is not generally regarded as affording a good basis for primary divisions in the classification of plants.

**CELLULAR PLANTS.** See CELLS; THALLOGENOUS PLANTS; VEGETABLE PHYSIOLOGY.

**CELLULAR TISSUE.** This is the old term for a widely diffused animal texture, which has also received the names of areolar, reticular, filamentous, and connective tissue. If we make a cut through the skin, and proceed to raise it, we see that it is loosely connected with the subjacent parts by a soft, filamentous, elastic substance, which, when free from fat, has a white fleecy aspect. This is the tissue in question. It is also found underneath the serous and mucous membranes which are spread over internal surfaces, and serves to attach these membranes to the parts which they line. We likewise find it lying between the muscles, the blood-vessels, nerves, etc., occupying the interspaces between the different organs, and often investing each of them with a special sheath. While it thus connects and insulates entire organs, it at the same time performs a similar function in regard to the minute parts of which each organ is made up. Thus, for instance, in muscular tissue, it enters between the fibers of the muscle, uniting them into bundles; and similarly, it enters into glands, etc. This is termed *penetrating* or *parenchymal* cellular tissue.

It is not only one of the most general and most extensively distributed of the tissues, but it is continuous through the whole organism, and may be traced without interruption from any one region of the body to any other. It is in consequence of this continuity that dropsical fluids, air, etc., effused into the C. T., may spread far from the spot where they were first introduced.

On examining a fragment of this tissue, when stretched out, we see with the naked eye that it presents the appearance of a multitude of fine, soft, colorless, elastic threads, like spun glass; intermixed with these are delicate films or laminae, crossing one another in all directions, and leaving open spaces, or areolæ; hence the name of areolar tissue.

A small quantity of colorless transparent fluid is always present in this tissue; when abnormally increased, it gives rise to the form of general dropsy known as *anasarca*. The microscopic characters of C. T. are briefly noticed in the article TISSUES, ANIMAL.

**CELLULAR TISSUE**, in botany, is any vegetable tissue formed of cohering cells alone, and in which there are no vessels. It is often called *parenchyma* (Gr. something spread out), although an attempt has been made to restrict that term to one kind of it, with cells of a particular form, and terms of Greek derivation have been multiplied for other kinds. The cells of C. T. vary much, both in form and size (see CELLS); but particular forms and sizes are characteristic of particular kinds or particular parts of plants. The products of the vital activity of plants are formed in the interior of cells, or by secretion from the inner side of their walls. Vessels being formed from cells, it is not easy to fix the limits between C. T. and *vascular tissue* (q.v.). Some kinds of plants, however, are entirely composed of C. T. (see next article); all consist of it in the earliest stages of their growth; none are at any time destitute of it. Fluids are transmitted from cell to cell, through the mass of C. T., passing through the walls of the cells where there are no openings that can be detected by the microscope.

**CELLULOID**, a remarkable modern invention, apparently capable of wide usefulness, wherever India-rubber and various kinds of cloth are now employed. Celluloid is produced by mixing gum camphor with a pulp of gun-cotton, and subjecting the combination to a high degree of pressure and heat. The result is a hard product of extraordinary toughness and elasticity. It can be made plastic again and molded into any required form. Any color can be given to it by the use of coloring matter during the process of manufacture. It is extensively used as a substitute for ivory, which it resembles so closely that it is sometimes difficult to detect the difference. It is said to equal ivory in strength and elasticity, and not to warp or discolor with time. It has proved a good material for piano and organ keys, billiard-balls, backs of brushes, looking-glass frames, handles for knives, forks, umbrellas, and many other articles. It is much cheaper than ivory, and is claimed to be better for decorative purposes. It is also used with much success to imitate tortoise-shell, malachite, amber, pink coral, and other costly materials. In imitation of tortoise-shell, it is made into combs, napkin-rings, match-boxes, card-cases, etc. Imitations of pink coral jewelry are made and sold at prices much below those of the genuine. The same is true of imitations of malachite and amber. Mouth-pieces for pipes, cigar-holders, etc., are common. It is also used as a substitute for porcelain in making dolls' heads. The frames of eye-glasses, opera-glasses, and spectacles are made of it, and it very soon became popular in

combination with linen, cotton, or paper, for shirt bosoms, cuffs, and collars. The material has a hard glistening surface, like that of newly laundered linen; is elastic and impervious to moisture, and when soiled can be renovated with a moistened sponge. There seems to be some danger in the manufacture of C. Though there have been explosions and several persons killed in one of the manufactories, it is said that with due care, and avoidance of unwarrantable experiments, the manufacture is not unsafe. C. was invented by A. Parkes, of Birmingham, in 1855 or 1856. The manufacture has been most largely developed in the U. S., where the chief seat of the industry is at Newark, N. J.

**CELLULOSE** is the term applied to the carbohydrate,  $C_6H_{10}O_5$ , which forms the mass of the cell-membranes of all plants. It is one of a class of compounds intimately connected in their chemical constitution, but presenting remarkable physical differences. Without entering into chemical details, we may mention the following points of difference between it and the chemically allied substances—sugar, dextrine, and starch. Sugar and dextrine are soluble in cold water, and occur in the cell sap in solution; starch is insoluble in cold water, but softens into a mucilage in boiling-water, and is found in granules in the cell-contents; while C. is insoluble in cold or boiling water, and, as far as is at present known, is very slightly soluble in the strong mineral acids, its only perfect solvent being a solution of oxide of copper in ammonia.

**CELLULOSE**, a substance designed for use in ship-building, and specially adapted to afford protection against blows, concussions, or perforations, either above or below the water-line. It consists of carbon, hydrogen, and oxygen, in the proportions in which they exist as the component parts of the cellular tissue of all plants, woods included. It composes the 'cells' of wood, as wax composes the cells of a honey-comb. It is the essential of the primary wall-membrane of the cells, isomeric with starch in its composition, and allied to starch, sugar, and inulin. Cotton and bleached flax, as well as hemp, are nearly pure cellulose. In some filter paper it has been produced almost absolutely pure. It is remarkable for its insolubility, being dissolvable only by an ammoniacal solution of copper. The material is usually made of the ground fibre of the cocoanut, with a small percentage of original fibres. It is extremely light, and has the property of rapidly swelling when wet. A cubic foot of it, as ordinarily prepared, weighs but seven and a half to eight pounds. It is practically free from danger of fire, burning very slowly and with great difficulty when compressed. The French made experiments with it by firing a 10-inch shot through a cellulose mattress. The fibres came together so rapidly that only about three and a half gallons of water per minute passed through the aperture, and it soon closed entirely. Its use was begun in 1884, and up to 1890 it had been put into about 40 vessels of the French navy, and into a number of ships in the Russian, Dutch, Japanese, and Greek navies. In 1890 its use was ordered in the construction of the vessels of the American navy. The cost as prepared for use is about \$350 a ton, or nearly \$1 a cubic foot. See **WOODITE**.

**CELSUS**, an Epicurean philosopher, but tinged with Platonism, lived in the 2d c. after Christ, and wrote, after 150 A.D., under the title *Logos Alethes* (the True Word) the first considerable polemic against Christianity. The book itself has perished; but considerable fragments have been preserved as quotations given by Origen in his answer, *Contra Celsum*, in eight books. In the fragments—which are very interesting, as showing the views of a heathen philosopher in regard to Christianity—C., with wit and acuteness, but without depth or earnestness of thought, prefers against the new religion charges of unphilosophicalness and blind credulity; and especially endeavors to convict Christians of self-contradiction in their spiritual doctrine contrasted with their anthropomorphic representations of Deity; in their religious arrogance contrasted with their confession of sinfulness; and in their views of the necessity of redemption. He also reproaches Christians with their party divisions.

**CELSUS**, **AULUS CORNELIUS**, a Latin physician and writer, who flourished probably in the reign of Augustus. He was called the Roman Hippocrates, because he generally followed the great "father of medicine," and introduced the Hippocratic system among the Romans. C. wrote not only on medicine, but also on rhetoric, history, philosophy, the art of war, and agriculture. His style is succinct and clear, but full of Grecisms. The only great work of his which survives, is the *De Medicinâ*, which is divided into eight books. The portions relating to surgery are exceedingly interesting and valuable, because C. has there given an account of the opinions and observations of the Alexandrian school of medicine. The first edition of the *De Medicinâ* appeared at Florence in 1478. C.'s works have been translated into several modern languages. A translation into English was made by Dr. Grieve, London, 1756. Among the best editions are those of Krause (Leip. 1766), Dr. Milligan's 2d edition (Edin. 1831), and Broca, *Conférences historiques* (1865).

**CELT** (Lat. *celtis*, a chisel), the name by which certain weapons or implements of the early inhabitants of western Europe are known among archæologists. Celts are either of stone or of bronze.

Stone celts vary in length from about 1 in. to 22 in.; but the most common size is from 6 to 8 in. in length, and from 2 to 3½ in. in breadth. They are made of almost every kind of stone, and show considerable diversity of shape, almost all,



however, having more or less resemblance to the muscle-shell. The ruder celts are generally of slate, shale, schist, or grit; the finer, of flint, porphyry, greenstone, syenite, or agate. Many of the finer celts are beautifully shaped and highly polished. A remarkable example of this class, the property of sir Coutts Lindsay, found near St. Andrews, in Scotland, is described by sir David Brewster in the *Philosophical Journal* for 1823. Recently, a class of celts found in the later geological strata have excited much interest as well among archaeologists as among geologists. They are obviously of the same type with the more common celts, but of ruder construction, as if fashioned by a more barbarous people. The stone C. was fastened into a handle of horn, bone, or wood. A C. of serpentine, with a handle of deerhorn, was found in one of the Swiss lakes in July, 1859, and a stone C. with a wooden handle, in the county of Tyrone, in Ireland.

Bronze celts vary in length from about 1 in. to 8 or 10 in., the most common length being about 6 inches. They are sometimes ornamented with rudely incised lines or circles, and have occasionally been found wrapped up in linen, or inclosed in bronze cases or sheaths. They show much greater diversity of shape than the stone celt. As many as four classes have been distinguished by archaeologists—1st, The simple wedge-shaped C., most nearly resembling the common form of the stone celt. 2d, The wedge-shaped C., with sides more or less overlapping, and a stop ridge or elevation between the blade and the part which received the handle. 3d, The wedge-shaped C., with sides greatly overlapping, with or without the stop-ridge, but with a loop or ear upon, and parallel to, its lower surface. 4th, The socketed C., or the C. with a hollow to receive the handle, and generally with a loop or ear upon its lower surface.

Both stone and bronze celts were probably used for several purposes, serving for chisels, adzes, and axes, as well as for weapons of war, like the stone hatchets of the South Sea Islanders and other savage or barbarous tribes.

**CELTIBERI**, a powerful people of ancient Spain, supposed to have sprung from a blending of the Iberians or Spanish aborigines with Celtic invaders from Gaul. The C. inhabited a large inland district of the peninsula, corresponding to the s.w. half of Aragon, nearly the whole of Cuenca and Soria, and a great part of Burgos, but the name Celtiberia had often a wider signification, including the country as far s. as the sources of the Guadalquivir. The C. were divided into four tribes, and were unquestionably one of the bravest and noblest peoples in the peninsula. Their cavalry and infantry were equally excellent. For many years, they withstood the efforts of the Romans to subdue them, and it was not till after the campaigns of Sertorius that they began to adopt the Roman language, dress, and manners.

**CELTIC NATIONS**, one of the groups of the great Aryan (q.v.) family.

**Languages.**—In addition to the English, and retreating before it, there are at present four languages spoken in the British Isles—the Irish, the Highland Scotch (or Gaelic), the Manx, in the isle of Man—all three nearly related to one another, and constituting the northern (Erse, Gadhelic) branch of the Celtic languages; whilst the fourth language, the Welsh, constitutes, together with the Cornish of Cornwall (extinct since 1778) and the Bas Breton of Brittany, the southern (Briton, Cymric, Cambric) branch. The remains of the language of the Gauls or Celts, the ancient inhabitants of France, closely resemble the British and Gadhelic idioms; hence the name Celtic languages has been applied to the whole of them. The Celtic idioms belong to the Indo-German (Aryan) family, as their numerals show. Compare

Old Irish.	Old Welsh.	Sanscrit.
1. óin	un	éka
2. dá	dou	dvâu
3. trí	tri	trayas
4. cethir (c=k)	pedwar	chatvâras
5. cóic	pimp	panchan
6. se	chwech	shash
7. secht(n)	seith	saptan
8. oct(n)	wyth	ashtan
9. noi(n)	nau	navan
10. deich	dec	daçan
20. fichet	ugeint	vinçati
100. cét	cant	çata

The Gaulish was nearer to the Cymric branch, its numerals 4 and 5 having been *petor*, *pempe*. There are a few Gaulish inscriptions which show a declension with full inflections; in old Irish, five cases still exist, but the terminations are very much mutilated; in Welsh, they have disappeared. Thus, the Gaulish name *Segomarus* is declined: gen. *-ri*, dat. *-ru*, acc. *-ron*; the old Irish, *fer*, a man, has the gen. *fir*, dat. *fiur*, acc. *fer*, voc. *fir*; whilst the correspondent Welsh *gur* is inflexible. Hence it follows that the pseudo-simplicity of the Welsh is the result of grammatical decay, common in all Aryan languages, and does not at all warrant Latham's theory, that the Celts branched off from the primitive Indo-German nation before the development of case inflections.

**History.**—Of the separation of the Celts from the other Aryans or Indo-Germans, and

their early migrations to western Europe, no record has come down, the stories about Milesian colonies in Ireland, and migrations from Troy into Wales, being simply monkish fictions. At the dawn of history, we find the *Gauls* (*Galli*, *Celte*, *Gulatas*) occupying France (*Gallia*), which was divided into *Aquitania*, between the Pyrenees and Garonne; *Gallia Celtica* proper, between Garonne and Seine; and *Belgica*, from the Seine to the Rhine. The land about the *Rhone* being more early conquered by the Romans than the rest, was set apart by them under the name of *Gallia Narbonensis*, or *Gallia Lugdunensis* (from the towns Narbo and Lugdunum, Narbonne and Lyon). The whole of the four was called Gaul beyond the Alps (*Gallia Transalpina*). A great many tribes of Gauls had settled in Lombardy, where they founded *Mediolanum* (Milan), and which therefore took the name *Gallia Cisalpina* (Gaul this side the Alps). Other Gauls had penetrated into Spain, where they became mixed with the native Iberians, and thus gave rise to the *Celtiberians* about the river Iberus (Ebro). Numerous hosts migrated across the Rhine, occupied southern Germany and Bohemia, and, following the course of the Danube, some invaded Thrace and Greece (278 B.C.); but being repelled, the main body of them settled in Asia Minor, in the province called after them *Galatia*. The Romans found the Gauls at first very formidable enemies; Rome itself was burned by them (389 B.C.), but gradually the Romans conquered first *Gallia Cisalpina* (222), then *Gallia Narbonensis* (112), and lastly, Caesar subjected all France (52 B.C.), after which the Gauls soon became Romanized. The Gauls of Asia Minor, for a long time the terror of all the neighborhood, were defeated by the Romans (187), and their land finally made a province of the empire (25 B.C.).—The *Britons* (*Britanni*; Welsh, *Brython*) were little known before Caesar's two unsuccessful expeditions into Britannia; the country was conquered by the Roman gen. Agricola (78–84 A.D.), who secured the new province against the inroads of the Caledonians of Scotland by a fortification across the Scotch lowlands, between the Forth and the Clyde, afterwards removed by the emperor Hadrian further southward, to between Solway firth and the mouth of the Tyne. The Britons were so much influenced by Roman civilization—they were also early converted to Christianity—that the heathen Angles and Saxons, who conquered them in the 5th and 6th centuries, called them *Welsh*; a name which, with the other Teutons, applies to all nations speaking languages of Latin descent. A few of the Britons maintained their independence in Cornwall, Cumberland, and in the mountains of *Wales*. On the last, the name *Welsh* was ultimately fixed by the English; they themselves, however, called their nation *Cymro*, pl. *Cymry* (a compound of *cyn*, with, in common, and *bro*, land = having a common country, countrymen, in contradistinction to the foreign invader), a name which has nothing to do with Cimbri and Cimmerii. The Welsh remained independent under different petty princes till 1282, when Edward I. conquered them. A part of the Britons went over in the 4th c. to France, where they took possession of *Brittany*, which maintained a doubtful independence under dukes of its own till about 1500.—Whether the *Caledonians*, the oldest inhabitants of Scotland, were Celts of the Cymric or Erse branch, is unknown. After the 3d c., their name disappears, and we hear, instead, of the *Scoti* and *Picti*. As to the latter, the same doubt prevails; but the *Scoti* were emigrants from Ireland, both *Seotus* and *Gadhelus* being common national names of the old Irish. From *Gadhel*, the modern *Gael*, *Gaelic* is derived, which has nothing to do with the name of the Galli.—*Ireland* (*Hibernia*, whence the modern *Eirinn* is derived), enters into the light of history with its conversion to Christianity by St. Patrick (460). The four centuries following on this event are the brightest period in its history. Ireland was then the seat of piety and learning, and sent forth numerous missionaries, by whom many monasteries, centers of civilization, were founded—as *Iona*, in Scotland, by Columba (563); *St. Gall*, by Gallus (615); *Würzburg*, by Kilian (687). In the 7th c., we find Irish bishops at Ratisbon; and *Virgilius* (Feargal), (died 784), bishop of Salzburg, played no small part in the ecclesiastical history of Germany. But Ireland remained politically divided among many princes, and so became an easy prey of those "black heathens" the Scandinavians, whose invasions began 795, and who founded Norse kingdoms at Dublin, Waterford, Limerick, etc. In the fierce battles between the two nations, the prosperity of Ireland rapidly declined, and the English conquest (1171) only completed the ruin.—The Isle of *Man*, inhabited by a branch of the Irish, after having been subject to Welsh, Scotch, Norse princes in turn, acknowledged England's sovereignty in 1844.

*Religion and Mythology*.—A few notices in the classics and the Latin inscriptions of Gaul are our rather meager sources of information on the Celtic paganism. As the three chief gods, or three of the chief gods, Lucan mentions *Teutates*, *Hesus*, and *Taranis*, all of them worshiped with human sacrifices. *Taranis* reappears as *Jupiter Taranucus* on an inscription; and from this identification with Jupiter, as well as from the fact that in Welsh *taran* means thunder, we may infer that he was the god of the thunderstorm. Other gods frequently occurring on inscriptions are *Apollo Granus*, *Apollo Belenus*, *Mars Camulus*, *Minerva Belisama*, etc., all of them, however, empty names to us. A remarkable feature in Gaulish religion was the worship of certain *Mother Goddesses* (called on the inscriptions *Junones*, *Matronæ*, *Dæ Matres*, *Campestres*, *Nymphæ*). They are frequently connected with special localities, as in the inscriptions dedicated to *Matrona Lanchiabus*, *M. Hamavehis*, *M. Rumanehabus*, and on the one in Gaulish: *Matrebo Nemaucicabo*, "to the Mothers of Nîmes." To this class apparently belongs the *Dea*

*Nehalennia*, once represented on a relief with a basket of fruit, and a dog for companion. Mela, the geographer, speaks of an island in the Atlantic, near Gaul, where there was an oracle superintended by nine maidens, who could cause storms, take the form of any animal, could cure what otherwise was incurable, and predicted the future. These goddesses, at once motherly and maidenly, residing in field and wood (campestres, nymphæ), givers of plenty and prophets of the future, are the heathen prototypes of the *fées* (fairies, as distinguished from "elfs") of the middle ages. The "little folk" were known to the Gauls under the name of *Dusi*. They believed in the existence of individual tutelary genii, as a stone of Lausanne shows, being erected by three Gauls *Sulfo suis* (hence our sylph?). The belief in the transmigration of souls was common amongst the Gauls, or at least their priests the *Druids*, so called from their performing sacred rites in oak-woods (Welsh, *derw*, an oak; *derwydd*, a Druid). These Druids were also the depositaries of knowledge and tradition, and constituted, in Gaul at least, a powerful hierarchy, with a supreme pontiff. Druids are found both in Ireland and in Wales, and the *fées* abound in Welsh tradition; but it is very doubtful whether the superhuman beings appearing in the Welsh poems of the 12th and 18th centuries—such as *Hu Gadarn*, the reputed founder of Bardic institutions (see beneath)—are genuine relics of the British religion. The belief in transmigration lasted very long, as the mediæval Welsh tale of *Taliesin* speaks distinctly of Taliesin's successive existences. Though not properly mythological, we may mention here the romantic stories of the Britons about king *Arthur* and his knights. He is first mentioned by Nennius in the 9th c.; but his fable was further developed in the next centuries both in Wales and Brittany, then embodied in Geoffrey of Monmouth's *Historia Britonum*, which served as the groundwork of the French *Roman de Brut* of Wace. Through these works, and partly, also, through the direct influence of the oral traditions of Brittany, it passed into French literature, and thence spread over all Europe.

*Literature*.—The Gauls learned writing from the Greeks; later, they employed the Roman alphabet, as do the Welsh and Irish, the now used Irish character being nothing but the common Anglo-Saxon form of the Latin alphabet. Besides, however, the Irish claim an old character of their own, the Ogham, in which the letters are represented by a number of vertical strokes put in a right angle to a horizontal line, or else by horizontal strokes to a vertical line. Some of the Ogham inscriptions are said to be older than Christianity. Even more doubtful is the antiquity of a Welsh so-called Bardic alphabet, in which there seem to be no inscriptions extant, and which is, at any rate, an alteration of the Roman character. A feature common to all Celts is the existence of a kind of literary order, the *Bards* (q.v.), poets and guardians of tradition—in Gaul, nearly related to or part of the priesthood; in Wales and Ireland, in immediate connection with the kings.—A Gaulish literature there certainly was, as Cæsar informs us that, in the schools of the Druids, the young men used to learn by heart a great number of verses on theological and historical subjects. But these poems were never written down. It is highly probable that rhyme, first used by St. Ambrosius (397) in his hymns, is of Gaulish origin, this being the common form even of the oldest Irish and Welsh poems.—The Irish literature began with the conversion, but our existing manuscripts are not older than the 9th or 8th century. Interlinear versions of biblical and other theological, or of grammatical writings are about the oldest manuscripts, many of which, in consequence of the missionary zeal of the nation, are to be found at St. Gall, Milan, and other continental places. Then there are ecclesiastic hymns, one of the oldest ascribed to Patrick. A renowned author of poems, in the 10th c., was Eochad O'Flin. Secular poetry of ancient times there has come down to us none, but we have testimonies as old as the 12th c. of the existence of such, ascribed in a general way to the old pagan hero Oisín, son of Mac-Cumhal. The existing specimens, mostly warlike—except some dialogues between Oisín and St. Patrick—are recent. Those Gaels that went over to Scotland, took, of course, similar traditions with them. With a partial knowledge of these, Macpherson composed (1765) the work which he declared (rather loosely) to be an English translation of the songs of the old Scotch poet Ossian, son of Fingal (the true Oisín was an Irishman). The would-be Gaelic original of Macpherson's work, edited in 1807, is either a compilation or retranslation. Of Irish prose, the annals are the most important part: first, those of Tighernach (1088), then the *Annales Inisfalienses*, A. *Ultonienses*; lastly, the *Annals of the Four Masters*, being a compilation made (1634) from older sources chiefly by four Franciscans, beginning with 242 after the deluge, and ending with 1616 A.D.—The oldest remains of Welsh literature are the songs, so far as they are genuine, of the bards of the 6th c.—*Llywarch Hen*, *Aneurin*, *Taliesin*—having chiefly the life and deeds of contemporary princes for their subject, but few in number. In the 10th c., we have the collection of laws by Howel Dda. The historians Gildas and Nennius, of the 9th c., wrote in Latin.

The great age of Welsh literature is the 12th and succeeding centuries, when the energies of the nation were roused in the struggle with England. In this contest, the bards played a conspicuous part as agitators. After a long interval, we hear again of a great bard, Meylyr (1100); many follow, amongst whom Kynddelw (1200) deserves special mention, both as a poet (we have 49 pieces of his) and a patriot. Welsh poetry consists in—1. Political lyrics, war-songs, songs in praise of chieftains, elegies on the same. 2. Religious hymns. 3. Pseudonymous poems, ascribed to Merddin (Merlin), the

mythical enchanter, and Taliesen, the old bard, having generally the form of prophecies on the struggle between the Saxons and Welsh, and the ultimate triumph of the latter. Thus, in the *Avalennau* (or apple trees), attributed to Merlin the Welsh nation is enigmatically represented under the image of "seven score and seven sweet apple trees," whose fruits, princes (viz., the English) wish in vain to despoil. 4. The Triads, short memorial (?) verses in which *three* remarkable events, subjects, or persons are respectively mentioned (hence the name), embracing history, theology, jurisprudence. 5. Dialogues of dramatic character. There were—apparently now lost—also miracle plays actually represented.

The only remarkable remnant of *Cornish literature* comes under this head, being three ecclesiastical plays of the 14th c.—the *Creation*, the *Passion*, and the *Resurrection*.—In Welsh prose, we have first the chronicles. Geoffrey's chronicle, though Latin, is thoroughly national; then there is that of Caradoc, who begins where Geoffrey leaves off; and the *Liber Landavensis*, a history of the bishops of Llandaff down to 1132. Further, we have the *Mabinogion* (Children's Tales), romantic stories. The most interesting of these refer to Arthur and his champions; the lady of the fountain, Peredur, Geraint (now revived by Tennyson), Arthur's boar-hunt. Amongst the non-Arthurian tales, special mention is deserved by the *Mabinogi of Taliesin*, interspersed with verses, relating the adventures, transformations into animal shape, and transmigrations of that bard. There are besides some scientific writings, a treatise on medicine, another on geometry, and one on Welsh prosody by Edeyrn (1260). This last, a grammatical essay in and on a vernacular tongue, is paralleled in the middle ages only by Icelandic literature, to which, upon the whole, the Welsh, although not quite so high, bears a marked resemblance.

*Concluding Remarks.*—Altogether, the Celts are a very important branch of our Indo-German family. The incessant warfares of the Gauls bespeak at least activity of mind and body; the Irish missions have done a great deal for European civilization; whilst the traditions of the Britons have deeply influenced mediæval literature. The one great defect of the Celts is incapacity for political organization. Their very enthusiasm, lively feeling, and vivid imagination, have ever prevented them from taking coolly and deliberately those measures which lead to national unity; hence it is that they gave way before the more practical Roman and Teuton. But while they lost their independence, and oftentimes their very language, in the contest with the foreigner, whose strong hand molded them into national unity, yet they reacted on him in their turn. They are fast disappearing by merging into the English; but if the quiet resolution, the sturdy common sense, the talent for public life, state organization, and political dominion, that characterize the modern British nation, are altogether Teutonic—on the other hand, their genuine refinement of manner and feeling, and their high poetical susceptibilities, are to no small extent due to the admixture of Celtic blood.

**CELTIS.** See NETTLE-TREE.

**CEMBAL D'AMORE**, an instrument belonging to the clavichord family. Its form was that of an English spinet. The strings were twice as long as those of the ordinary clavichord, and when touched the keys struck the central node of the string, both halves of which vibrated simultaneously. There were two bridges instead of one, as in the clavichord, and two sound-boards of unequal forms and dimensions. The cembal d'amore stands between the clavichord and the pianoforte. The Rev. J. C. Cotter, of Cork, endeavored to obtain the effect of the cembal d'amore on a pianoforte, which he had made by Messrs. Broadwood about 1865. In this instrument, which he termed the lyrachord, the clarinet quality was prominent.

**CEMBRA NUT AND CEMBRA PINE.** See PINE.

**CEMENTATION OF STEEL** is the process followed in the production of *blistered steel* (q. v.), or *steel of cementation*.

**CEMENTS.** A cement is a substance used to make the surfaces of solid bodies adhere to one another; it is applied in a liquid or viscous state, and hardens after the surfaces are brought together. When fused metals or alloys are used in this manner, they are called solders. There is a great variety of C. derived from animal, vegetable, and mineral substances. Animal C. are chiefly composed of gelatine and albumen as their bases. Joiners' glue (q. v. under GELATINE) is an example. The binding materials of vegetable C. are gums, resins, and wax. The mineral C. are chiefly of lime and its compounds. In many C., animal, vegetable, and mineral substances are combined. The simplest of the mineral C. is plaster of Paris, which is used for uniting slabs of marble, alabaster, and many similar purposes. It is mixed with water to the consistence of thick cream, and then applied. This hardens rapidly, but is not very strong. Its hardening depends upon the true chemical combination of the water with anhydrous sulphate of lime, of which plaster of Paris is composed, and the formation thereby of a solid hydrate. The plaster of Paris may be mixed with thin glue, with diluted white of egg, or a solution of size or gum, instead of water, and is strengthened thereby.

Keene's marble cement is prepared by steeping plaster of Paris in a concentrated solution of alum, then recalcining and powdering. This powder is mixed with water in the same manner as plaster of Paris. It is used as a stucco for internal decorations,

takes a high polish, and when colored, forms beautiful imitations of mosaic, marble, scagliola, etc.

A mixture of paper pulp, size, and plaster of Paris in equal proportions, forms a useful cement, and is also used as a sort of papier-mâché for casting into architectural ornaments, etc.

Common mortar is one of the most important of the lime cements. It is composed of slaked lime, or a mixture of this with sand; its hardening depends upon the slow formation of carbonate of lime by the absorption of carbonic acid from the atmosphere, and a partial combination with the silica of the sand. Cow-hair is sometimes mixed with it, to bind it when laid in masses. In order to obtain a fine smooth paste, which is required for good mortar, the lime should be slaked rapidly by adding about three parts of water to one of lime; if the quantity of water is too small, a coarser or semi-crystalline hydrate of lime is produced by the slaking. For the mode of applying mortar, see BRICKWORK.

*Hydraulic cement*, or cement that can "set" and harden under water, is produced in great quantities in the United States. It was first discovered at Chittenango, N. Y., in 1818, by Canvas White, who received \$20,000 from the state for the information. The largest manufactory of this cement is now at Kingston, N. Y. The production of hydraulic cement in the U. S. for 1894 was 7,813,776 barrels of 300 lbs., of a value of \$1,455,928, and in 1895 the production was 7,694,053 barrels.

Pozzuolana, a porous lava found at Pozzuoli, near Naples, has been long celebrated for its property of forming a hydraulic cement, when mixed with ordinary lime. It is mainly composed of silicates of alumina, lime and soda. Portland cement, so named from its resemblance to Portland stone when dry, is made from clay which is intimately mixed with chalk, and then burned. Roman cement is similar to the Portland, but of a darker color; it contains a larger proportion of clay, and solidifies more rapidly. These C. should be mixed with water to form a moderately thick paste; the surfaces to which they are applied should be well wetted, and the cement kept slightly moist until it hardens. The solidification of hydraulic C. depends upon the combination of the lime with the silica and alumina forming first a hydrated compound, and finally a true silicate. The production of Portland cement in the U. S. in 1894 was 611,229 barrels of 400 lbs. of a value of \$1,209,446, and in 1895 the production was 749,059 barrels.

Cement composed of ox-blood thickened with finely powdered quicklime, is used by coppersmiths, for securing the edges of rivets of copper boilers, and for steam-joints. Another cement for steam-joints is made with borings or turnings of cast-iron mixed with a little sal ammoniac and flowers of sulphur. It should be stirred up with a small quantity of water, just sufficient to moisten it, then rammed into the joint, which should be bolted up as tightly as possible: 5 lbs. of iron borings to 2 oz. of sal ammoniac, and 1 oz. of sulphur, are the proportions recommended. A cement of this kind may be made of 4 lbs. iron borings, 2 lbs. pipe-clay, and 1 lb. of powdered earthenware fragments made into a paste with salt and water; or 2 parts litharge in fine powder, 1 part very fine sand, and 1 of quicklime that has slaked spontaneously in a damp place. These should be mixed, and kept from the air, and made into a paste with boiled linseed oil when about to be used. This is a valuable cement for steam-joints, for mending cracks in boilers, ovens, etc. Beale's patent fireproof cement, for similar purposes, is composed of chalk, 12 parts; lime and salt, each 4 parts; Barnsey sand, 2 parts; iron filings or dust, 1 part; and blue or red clay, 1 part. These are ground and calcined together.

*Electrical Cement*—so called from its use in uniting the cylinders of electrical machines to their axes, and for a variety of similar purposes—is composed of 5 lbs. rosin, 1 lb. each of bees'-wax and red ochre, and 4 oz. of plaster of Paris. This is Singer's formula. A cheaper cement of this kind may be made from 14 parts rosin, 2 red ochre, and 1 plaster of Paris. These should be melted together till the frothing ceases, and the composition runs smoothly. This is applicable to a variety of purposes, where a cheap and tolerably adhesive cement is required. It will serve as bottle-wax for sealing the tops of corks; but this is usually prepared from 4 parts rosin with one of tallow or suet, and red ochre or other coloring matter added.

For mending earthenware and china, etc., a variety of C. are recommended. For ornamental glass or china, which is not subjected to heat or rough usage, Canada balsam that has evaporated until rather hard, is a very useful cement; from its transparency, it makes an almost invisible joint. The surfaces should be slightly warmed, and the balsam brushed over them, after which they should be kept pressed together for a short time. Thick copal or mastic varnish may be used in the same manner. Gum shellac, dissolved in spirits of wine in sufficient quantity to form a treacly liquid, forms a stronger cement than the above, but its color is objectionable for some purposes. The shellac may be dissolved in naphtha, but is not equal to that in spirits of wine. The *liquid glue* sold in the shops is usually prepared in this manner; another kind is made of a mixture of the solutions of shellac and India rubber. The cement sold in sticks at fairs and in the streets of London by loquacious itinerants, is shellac or gum mastic fused and molded into a convenient form, and is one of the most useful C. when properly applied, by heating the surfaces to be joined just sufficiently to fuse the shellac and then smearing them thinly with it, and pressing them together. If shellac is heated much above its fusing-point, it becomes carbonized and rotten, and therefore great care

must be used in fusing any composition of which it is an ingredient. The *marine glue*, a mixture of shellac and India rubber, is a remarkable cement, and when applied, as the last, with the precautions just alluded to, is so strong, that glass or china cemented with it, and then dashed on the ground, or otherwise broken again, will give way in any part rather than that cemented. This cement may be purchased ready made. For the mode of preparing it, see *GLUE*.

*Universal Cement*, used for the above and many other purposes, is prepared as follows: Curdle skim-milk with rennet or vinegar, press out the whey, and dry the curd at a very gentle heat, but as quickly as possible. When it has become quite dry, grind it in a coffee or pepper mill, and next triturate it in a mortar until reduced to a very fine powder. Mix this powder with  $\frac{1}{10}$ th of its weight of new dry quicklime, also in very fine powder, and to every ounce of the mixture add 5 or 6 grains of powdered camphor; triturate the whole well together, and keep it in small wide-mouthed phials well corked. When required, make it into a paste with a little water, and apply it immediately.

*Cheese Cement* is similar in composition and uses. Take two parts of grated cheese and one of quicklime in fine powder; beat these together with white of egg to form a paste, and use immediately.

The following is the reputed formula for preparing the *Armenian or diamond cement*, used by the Armenian jewelers for attaching diamonds, etc., without any metallic setting: "Dissolve 5 or 6 bits of gum-mastic, each the size of a large pea, in as much rectified spirit of wine as will suffice to render it liquid; and in another vessel dissolve as much isinglass, previously a little softened in water—though none of the water must be used—in French brandy, or good rum, as will make a 2-ounce phial of very strong glue, adding two very small bits of gum galbanum or ammoniacum, which must be rubbed or ground till they are dissolved. Then mix the whole with a sufficient heat. Keep the glue in a phial closely stopped, and when it is to be used, set the phial in boiling water." This cement has a great reputation, but our experience does not confirm it. We have tried the above, and several other receipts, with very little success. We doubt whether the true method of preparing it is known in this country, and suspect that it still remains one of the oriental trade-secrets. White of egg, thickened with finely powdered quicklime, forms a useful cement, especially if the cemented article is warmed for a short time in a slow oven.

*Cutlery Cement*, used for fixing knives and forks in handles, is made of equal weights of rosin and brick-dust melted together; or, for a superior quality, 4 parts of rosin, 1 of bees-wax, and 1 of brick-dust.

*Mahogany Cement*, used for stopping cracks and holes in mahogany, may be prepared by melting 4 parts of bees-wax with 1 of Indian red, and as much yellow ochre as is found requisite to give the color. If shellac be substituted for the bees-wax, and less red used, a much harder cement is made.

For light cement for joining paper articles and artificial flowers, see *GELATINE; PASTE*.

**CEMETERY**, from the Greek, may mean any grave-yard, or other place of deposit for the dead; but it has lately acquired a special meaning, applicable to those extensive ornamental burial-grounds which have recently come into use in this and other European countries, as the practice of burying within and around churches was gradually abandoned (see *BURIAL*). The fine burial-grounds of the Turks, extending over large tracts adorned by cedars and other trees, may have suggested the plan to Europeans. It was first exemplified on a great scale in Paris, in which, as the largest walled town in Europe, the disposal of the dead was long a matter of extreme anxiety and difficulty. There are few considerable towns in Britain near which there is not at least one C., and the legislation mentioned under the head of *BURIAL* has rendered their establishment, to a certain extent, a legal necessity. There was at first a natural feeling of regret at the prospect of deserting places of deposit for the dead so hallowed by ancient use and recent associations as the church and the churchyard. In many instances, however, the places thus professedly hallowed were in reality surrounded by degrading and disgusting circumstances. On the other hand, the new places of interment began to develop humanizing and elevating influences, in beautiful trees and flowers, natural scenery, and works of monumental art. The new cemeteries are in many instances cheerful open places of recreation, and in them the place of rest for the dead has rather tended to improve than to undermine the health of the living. One of the oldest established European cemeteries is that of Père la Chaise, near Paris (see *LACHAISE*), the arrangements of which have been generally followed in the cemeteries of London and other English cities; with, however, this distinct difference, that the English cemeteries are divided into two portions—one consecrated for the burials of members of the established church, over whose remains the funeral service is read, and one unconsecrated for the burials of dissenters. In the Scottish such distinctions are not required, though the Episcopal church has some consecrated burying-places. In the United States, as at Philadelphia and New York, there are cemeteries equal in point of arrangement to any in Europe. The famous Père la Chaise is the most celebrated of modern cemeteries, although by no means the largest. It was laid out in 1804, and com-

prises about 200 acres, and more than 16,000 monuments erected to the memory of nearly all the great men of France of the present century. Twice this C. and the neighboring heights have been the scene of desperate fighting. In 1814, during the attack on Paris by the allies, it was stormed by a Russian column; and in 1871 the communists made their last stand among these tombs, where 900 of them were killed, 200 being buried in quicklime in one huge grave, and 700 in another. Paris has also the cemeteries of Mont Parnasse and Montmartre, besides many smaller burial-grounds. In 1874, a very large C. was laid out 16 m. n. of Paris, covering nearly 1300 acres. In France, every city and town is required by law to provide a burial-ground beyond its barriers, properly laid out and planted, and each interment must take place in a separate grave. This law does not apply to Paris, however. There the dead are buried 40 or 50 at a time in the *fosses communes*, the poor being interred gratuitously, and a charge of 30 francs being made in all other cases. The *fosses* when full is left undisturbed for 5 years; then all the crosses and other memorials are removed, the level of the ground is raised 4 or 5 ft. by fresh earth, and interments begin again. For 50 francs a grave can be leased for 10 years; but when permanent monuments are desired the ground must be purchased in fee.

In English cities, about 1840, the people began to discuss the dangers to public health arising from the condition of the grave-yards surrounding, and the vaults within and underneath, the great churches. In London, these receptacles were literally crammed with coffins, and the surrounding air was infected to a dangerous degree. Coffins were piled upon each other until they came within a few inches of the surface of the ground, and then the ground was raised from time to time until its level came nearly up to the lower windows of the church. To make room for new burials, old bones were thrown out, and this led to systematic robbing of graves for the sake of the coffin plates and the pretty ornaments sometimes buried with the bodies. The result of this action and discussion was an entire change in the system. Burials within the limits of cities and villages were prohibited, and as a necessity rural cemeteries were founded. The chief cemeteries of London at present are: Kensal Green, on the Harrow road, 2½ m. from Paddington; Highgate, on a slope of Highgate hill; Abney Park; the Norwood and Nunhead cemeteries, on the s.; the west London C., at Brompton; Ilford and Leystone cemeteries in Essex; the Victoria and Tower Hamlets cemeteries in e. London; while further from the city were the cemeteries of Woking and Colney Hatch.

The dead-houses (Leichenhäuser) of Frankfort and Munich form a remarkable feature of the burial customs of those cities. The objects of the founders were to obviate the remotest danger of premature interment, and to provide a respectable place for the reception of the dead, in order to remove the bodies from the often confined dwellings of the friends. At Frankfort, the dead-house is at the entrance to the cemetery. It consists of a warder's room, where an attendant is always on duty; on each side are five rooms, well ventilated, and kept at even temperature, and each one is furnished with a bier, on which a corpse can be laid. On one of the fingers of a corpse is placed a ring, to which is attached a light cord, connecting with a bell which hangs outside of the attendant's room. Bodies deposited here are inspected at regular intervals by a medical officer, and the warden is always on the watch for the ringing of the bell. The importance of this care was once proved at Frankfort by the revival of a child. The attendants are required to receive and treat the dead with all respect, and no interment is permitted until signs of decomposition appear. The relations are then notified, and a funeral is held. Similar mortuaries have been established in many English towns.

Of the cemeteries still in use in southern Europe, the catacombs of Sicily are the most remarkable. In one of these, near Palermo, under an old Capuchin monastery, there are four subterranean corridors, in which more than 2,000 corpses are ranged in niches in the wall, many of them shrunk into the most grotesque attitudes, or hanging with pendent heads or limbs from their receptacles. As a preparation for its niche, the body is desiccated in an oven, and then dressed as if in life and put in its place in the wall. At one end of this C. there is an altar, strangely ornamented with a mosaic of human skulls and bones.

*Campo Santo* (holy field) is now the Italian designation for a cemetery or burying-ground, but more especially for an inclosed place of interment, surrounded internally by an arcade, and destined to receive the remains of persons of distinction. The most famous C. S., and that from which the others derived the name, is that of Pisa—in the neighborhood of the Dome, and consecrated to the memory of men who had deserved well of the republic. It was founded by Archbishop Ubaldo, towards the end of the 12th century. The archbishop, having been driven out of Palestine by Saladin, brought his fifty-three vessels, which had been destined for the conquest, laden with the earth of the Holy Land. This he deposited on the spot which was thence called the holy field, and which, as we have said, gave its name as a generic term to the burying-grounds of Italy. The architect of the existing building was Giovanni Pisano, under whose superintendence it was completed in 1288. It contains an area of 400 ft. in length, and 118 in breadth; and is surrounded by a lofty wall, on the inner side of which a wide arcade runs round the whole inclosure, giving to it the character of one magnificent cloister. At the smaller eastern side, there is a large chapel, and two smaller chapels of smaller size on the northern side. The lofty circular arches of the arcade are filled with the

richest Gothic tracery, which belongs, however, to a later date—the latter half of the 15th c.—and consequently formed no part of the original design. The walls are adorned with frescoes which are of great interest and value, both absolutely and with reference to the history of art. The oldest of those which have been preserved adorn one side of the eastern wall; they represent the passion of Christ, his resurrection, and other sacred subjects. These remarkable paintings are supposed to date before the middle of the 14th c., and are ascribed to Buffalmacco. But the most marvelous productions are those of Giotto (q. v.), of Simone Memmi, and of Andrea and Bernardo Orcagna.

Among nations in the east cemeteries have been in use from the earliest times. In China the high grounds near Macao and Canton are crowded with tombs, many of them in the form of small tumuli with a low encircling wall, like the ringed barrows of western Europe. But the most picturesque of all cemeteries are those of the Turks. From them it was, perhaps, that the first idea of the modern C., with its ornamental plantations, was derived. Around Constantinople the cemeteries form vast tracts of cypress woods, under whose branches stand thousands of tombstones. A grave is never reopened; a new resting-place is given to every one, and so the dead now occupy a wider territory than that which is covered by the homes of the living. The Turks believe that until the body is buried the soul is in a state of discomfort, and the funeral, therefore, takes place as soon as possible after death. No coffin is used; the body is laid in the grave, a few boards are placed around it, and then the earth is shoveled in, care being taken to leave a small opening extending from the head of the corpse to the surface of the ground, an opening not unfrequently enlarged by dogs and other beasts which plunder the graves. A tombstone of white marble is then erected, surmounted by a carved turban, in case of a man, and ornamented by a palm branch in low relief, if the grave be that of a woman. The turban by its varying form indicates not only the rank of the sleeper below, but also the period of his death, for the fashion of the Turkish head-dress is always changing. A cypress is usually planted beside the grave, its odor being supposed to neutralize any noxious exhalations from the ground, and thus, every C. is a forest, where by day hundreds of turtle-doves are on the wing or perching on the trees, and where bats and owls swarm undisturbed at night. These cemeteries are a favorite resort for Turkish women, some of whom are always to be seen praying beside the narrow openings that lead down into a parent's, a husband's, or a brother's grave. The cemeteries of the Armenians abound in bas-reliefs, which show the manner of the death of the person beneath, and on these singular tombstones are frequent representations of men being decapitated or hanging on a gibbet.

America closely followed England in the sanitary reform of burial-places, and many years ago burial within certain limits of cities was prohibited except in special cases, such as the use of private vaults in church-yards. The earliest of the great cemeteries in the United States was Mount Auburn, near Boston, covering 125 acres, lovely by nature, and most elaborately adorned.

Laurel Hill C., in Philadelphia, was opened in 1836. It is on the Schuylkill River, about 4 m. n. of the center of the city, and is part of a region of romantic beauty, abounding in gentle declivities, picturesque lawns, rugged ascents, rocky ravines, and flowery dells. A carriage drive, along the river front, connects Fairmount Park and the Wissahickon; thus bringing the ever-varying activity of the living into association with the tranquil resting-places of the dead. Since the first purchase of ground, several larger tracts have been added to it; while, under the management of various associations, other portions of the beautiful vicinity have been, in a similar manner, consecrated and adorned. This was followed by Greenwood C., the first and one of the greatest popular burial-places for New York and Brooklyn. The company was chartered in 1838. The grounds, which comprise 474 acres, occupy the hills and valleys on the e. side of the bay of New York, about 8 m. s. of the city hall in Brooklyn. The situation is one of the finest in all the region. From the higher points of the C. the eye takes in the two cities of New York and Brooklyn, the bay, half a dozen cities in New Jersey, the far-off Palisades, the broad lower bay, the Highlands near Sandy Hook, Coney Island, the rich garden lands of King's county, and a grand view of the Atlantic ocean. This C. has five entrances; nearly 20 m. of stone-bedded avenues, and 17 m. of concrete paths. Water for drinking and irrigation is supplied from the city works to nearly 40 hydrants. There are eight lakes of varying dimensions, and four ornamental fountains. The first interment was on the 5th of Sept., 1840, and the average annual number of bodies interred is from 5000 to 6000. Lake View Cemetery, at Cleveland, Ohio, is one of the many celebrated places of interment in the interior states, and contains the Garfield mausoleum. Spring-Grove Cemetery, at Cincinnati, contains 600 acres, and has been laid out at great expense. Minneapolis, also, has a very beautiful cemetery.

CENCI, BEATRICE, b. 1577, called "the beautiful parricide," was the daughter of Francesco Cenci, a wealthy Roman nobleman. According to Muratori (*Annales*, lib. x.), Francesco was twice married, Beatrice being his daughter by the first wife. After his second marriage he treated the children of his first wife in a revolting manner, and was even accused of hiring bandits to murder two of his sons on their return from Spain. The beauty of Beatrice inspired him with the horrible and incestuous desire to possess her person; with mingled lust and hate, he persecuted her from day to day, until circum-



stances enabled him to consummate his brutality. The unfortunate girl besought the help of her relatives, and of pope Clement VII. (Aldobrandini), but did not receive it; whereupon, in company with her step-mother, and her brother, Giacomo, she planned and executed the murder of her unnatural parent. The crime was discovered, and both she and Giacomo were put to the torture; Giacomo confessed, but Beatrice persisted in the declaration that she was innocent. All, however, were condemned, and put to death, August, 1599, in spite of efforts made in their behalf. Such is Muratori's narrative. Others allege that Beatrice was the innocent victim of an infernal plot. The results of Bertolotti's investigations (*Francesco Cenci e la sua Famiglia*, 1877), based on original documents and contemporary notices, go far to deprive the story of the Cenci tragedy of the romantic elements on which Shelley's powerful tragedy mainly turns. Francesco, it would appear, was profligate, but no monster; Beatrice at the time she murdered her father, was not 16 but 21 years of age, was far from beautiful, and probably had already a tarnished moral reputation. And Bertolotti is further convinced that the sweet and mournful countenance which forms one of the treasures of the Barberini palace in Rome, is not only not the portrait of Beatrice, but was not even painted by Guido, to whom it has long been unhesitatingly attributed.

• **CENEDA**, now officially called VITTORIO, a city of northern Italy, province of Treviso, 36 m. n. of Venice. Pop. 11,000. It is an episcopal see, has a very handsome modern cathedral and a fine monolithic fountain. Under the republic of Venice it was rich, and famed for its manufactures of woolen cloth, silk, and paper. C. is very ancient, dating from the time of the Romans, but now it is a decayed city.

**CENIS, MONT,** or **MONTE CENISIO**, a mountain-pass of the Alps, between Savoy and Piedmont, forming part of the water-shed between the valleys of the Doire and the Arc. The culminating point of the pass reaches an elevation of 6,775 ft. above the sea. Schist, limestone, and gypsum, in alternate beds, compose the strata of the mountain, the vegetation of which is rich in the rarer kinds of Alpine plants. Over the pass a road was constructed (1803-10) by the chevalier Fabbioni, under Napoleon's orders, at an expense of \$1,500,000. This is the safest, and most frequented road across the Alps.

**CENIS, MONT,** is a remarkable piece of railroad building completed in 1870. In 1865, an English engineer obtained permission from the Italian and French governments to lay a railway on the line of Napoleon's carriage road over the mountains. The road was built in the ordinary way with the addition of a third rail midway between the outer ones, and raised nearly a foot higher. This third rail was strongly gripped by the driving wheels, by which means the trains could safely traverse very sharp curves and descend grades as steep as 1 ft. in 12. On the French side the rise to the summit in 6½ m. of road was 4,460 feet. Then there was a stretch of 5 m. nearly level, and after that the descent to Susa on the Italian side, a distance of 20 m. over curves so numerous and so sharp that the view changed almost every minute, trains descended by the momentum of weight, the speed being regulated by brakes. This road was superseded by the one now in use, which runs through the great tunnel. (See **TUNNEL**.)

**CENOBITES.** See **MONACHISM**.

**CENOMANIAN.** (French.) The name given by the French to the Lower Chalk and Upper Greensand of English geologists.

**CENO'NYCE.** See **REINDEER MOSS**.

**CENO'TAPH** (Gr. *kenotafion*, from *kenos*, empty, and *taphos*, a tomb), a monument which does not contain the remains of the deceased. They were originally erected for those whose bones could not be found, e.g., for those who had perished at sea. Later, the name was applied to tombs built by a man during his lifetime, for himself and the members of his family.

**CENSER** (Fr. *encensoir*, from Lat. *incendo*, to burn), a vase, or other sacred vessel, used for burning perfumes. See **INCENSE**. Censers were much used in the Hebrew service of the temple, but their form is not accurately ascertained, and it is probable that they varied in this respect, according to the occasions on which they were used. The C., called also a *thurible* (Lat. *thuribulum*, from *thus*, frankincense), is used in the Roman Catholic church at mass, vespers and other offices. It is suspended by chains, which are held in the hand, and is tossed in the air, so as to throw the smoke of the incense in all directions. It varies very much in form.

**CENSORI'NUS**, a chronologist and grammarian of the 8d c., known by a work called *De Die Natali*, in which he treated of man's generations, his natal hour, and the influence that the stars and genii exercise over his fate. It was by some work of his on chronology that certain important dates have been ascertained.

**CENSORS**, the name of two Roman officers of state. The office was established by Servius Tullius, the fifth king of Rome. After the expulsion of the kings, it was held by the consuls, special magistrates not being appointed till 443 a.c. It continued to be filled by patricians till 351 b.c., when C. Marcus Rutilius, a plebeian, was elected. Twelve years later, it was enacted that one of the C. (there were always two) must be a plebeian. In 181 a.c., both C. for the first time were plebeians. The C. were

elected in the *comitia centuriata*, presided over by a consul. The term of office at first lasted five years, but was shortly afterwards limited to 18 months. The censorship was regarded as the highest dignity in the state, except the dictatorship. It was a sacred and irresponsible magistracy, whose powers were vast and undefined, and whose decisions were received with solemn reverence. The duties of the C. were threefold. 1. The taking of the census, or register of the citizens and of their property. 2. The *regimen morum* (regulation of morals). 3. The administration of the finances of the state. The taking of the census (Lat. *censeo*, to value, to take an account of) was originally their sole function (hence their name), and was held in the Campus Martius, in a building called *villa publica*. The *regimen morum* was the most dreaded and absolute of their powers. It grew naturally out of the exercise of the previous duty, which compelled them to exclude unworthy persons from the lists of citizens. Gradually, the superintendence of the C. extended from the public to the private life of citizens. They could inflict disgrace (*ignominia*) on any one whose conduct did not square with their notions of rectitude or duty. For instance, if a man neglected the cultivation of his fields, or carried on a disreputable trade, or refused to marry, or treated his family either too kindly or too harshly, or was extravagant, or guilty of bribery, cowardice, etc., he might be degraded, according to his rank, or otherwise punished. The administration of the finances of the state included the regulation of the *tributum*, or property-tax; of the *vectigalia*, such as the tithes paid for the public lands, salt-works, mines, customs, etc., which were usually leased out to speculators for five years; the preparation of the state budget, etc.—See Rovers, *De Censuram apud Romanos Auctoritate et Existimatione* (Utrecht, 1825).

**CENSORSHIP OF THE PRESS**, the term generally applied to the arrangements for regulating what may be printed, in countries where the press is not free. The simplest form of C. is when a public officer—the censor, or licenser, as he is sometimes called—reads over the MS. to be printed, and, after striking out any objectionable passages, certifies that the work may be printed. Thence it is common in old books to see the word *imprimatur*—let it be printed—followed by one or more signatures. Though it has its name from an analogy with the functions of the Roman censor, the C. did not come into operation until the invention of printing. It was common to all European countries, Great Britain included. The C. was established by act of parliament in 1662, 18 Char. II. c. 38: "An act for preventing the frequent abuses in printing seditious, treasonable, and unlicensed books and pamphlets, and for regulating of printing and printing-presses." This was a temporary act, renewed from time to time; and its renewal was refused in 1693, owing to a quarrel between the house of commons and the licenser. Since that time there has been, generally speaking, no restriction in Gt. Britain on what any man may publish; and he is merely responsible to the law, if in his publication he should commit any public or private wrong. See AMERICAN JOURNALISM; BOOK-TRADE; COPYRIGHT; LIBEL; NEWSPAPER.

**CENSUS** means, in the U. S., the periodical counting of the people. It is a Latin word applied by the Romans to one of the functions of their censors (q.v.). They had to enumerate the people, but only for immediate purposes of taxation, so that no account of the results of such enumerations has been preserved. The numbering of the people, though on one special occasion forbidden by the highest power, is an ancient custom. Moses numbered the Israelites in the wilderness, and, in later times, Joshua and David followed his example. The Chinese tell of a C. of their people taken 2042 years before the birth of Christ. In Japan an enumeration was made about 1900 years ago. Solon ordered the C. of Athens to be taken, especially with reference to classes of the people and taxable property. Servius Tullius, sixth king of Rome, ordered a C., when every citizen had to appear on the field of Mars and declare on oath his name and residence, the number and names of his children, and the value of his property. Failing to do this, his property might be confiscated and himself scourged and sold for a slave. Augustus enlarged the scope and improved the manner of taking the census. In the 16th c. the church began to record births, marriages, and deaths, and from this practice gradually grew up the modern C., though there does not appear to have been any exact popular C. made until after the beginning of the 18th century.

Russia, then almost a barbarous country, appears to have led other nations in C. taking. Partial enumerations were made in 1700, 1704-06, and 1710. In 1719 Peter the Great sent a commission into all the provinces to make a general census. This commission took account of the number of peasants, mechanics, domestics, and men unemployed. Women were not taken into account at all at the commencement, but they were recognized before the work closed, and in some districts were partially enumerated. In 1722, the C. distinguished the insane and infirm without means of subsistence and the czar ordered that a C. should be taken every twentieth year. In 1802 a central bureau of statistics was organized; reorganized in 1852, and again in 1858. This bureau is charged with the taking of the C., which now includes much the same information as that obtained in the United States.

Prussian enumerations were begun under Frederick William I., and improved by his successor. From 1748 to 1800, the C. was taken annually, except when prevented by war. In 1805, the central bureau of statistics was established. In 1834, a triennial C. was ordered. The schedules for questioning were very full, and the enumeration was to be

made some one day in December. The first C. of the German Empire was taken on the 1st of Dec., 1871. Austria first took a C. in 1754, and kept it up triennially until 1857, when it was enacted that the enumeration should be made every sixth year. In Sweden, as early as 1686 there was a law requiring the clergy to record marriages, legitimate and illegitimate births, deaths, persons removed from or settled in parishes, and all the population, arranged by place of habitation and households. Such information was first published in 1746. A statistical bureau was established in 1857, to collate and publish C. and other statistical information. Norway has kept up a decennial C. since 1815, and the work is usually thoroughly done. In Spain, enumerations were made in 1787, 1798, 1857, 1860, 1867, and the last in 1887. The work is done by government officials in one night. Denmark had a C. once in five years, from 1840 to 1860; now it is decennial, the last enumeration being on the 1st of Feb., 1890. The first C. of Portugal was made Jan. 1, 1864. Since then enumerations were made in 1878 and in Nov., 1890. Switzerland began its enumerations about 1750. Her C. is now decennial. Belgium doubtless leads all nations in the fullness and accuracy of her statistics, although her C. is taken but once in ten years. The last was in 1896. The Netherlands C. is decennial. The last was taken Dec. 1, 1890. Italy has an enumeration once in ten years, the last Dec. 31, 1891. Greece counts up irregularly. From 1836 to 1845, a C. was made every year; then in 1848, 1853, 1856, 1861, 1868, and 1889. Turkey has never taken a C. except for conscription or taxation. The first C. on record in France was taken in 1700 and published in 1720. There was a general C. taken in 1800, and a decree of the national convention ordered that it should be continued every fifth year. Since about 1820, the C. has been taken very regularly. Brazil began in 1872, the Argentine Republic in 1869, Colombia in 1870, and Egypt in 1863. In Germany and England and Spain the entire enumeration is made in a single day, or night. The last census in Germany was taken in 1890; the last in Austria, in 1891; the last in Great Britain and her colonies in 1891; the last in France in 1896; the last in the U. S., in 1890.

Census work began in the United States with the beginning of the government. In order to secure a proper apportionment of representatives in the lower house of congress a C. is taken every tenth year. At first it was nothing more than an enumeration of the people, classifying slave and free. Additions and improvements were made until the schedules of 1870 comprised questions as to name, age, sex, color, conjugal condition, place of birth, and place of birth of father and mother. To these were added particulars as to schools, libraries, newspapers, churches, diseases and mortality, pauperism and crime, school, military, and citizenship ages; areas of farms, families and dwellings; the blind, deaf and dumb, insane and idiotic, occupations of the people, wealth, taxation, and public indebtedness, and the amount and value of the products of agriculture and manufactures. The questions were certainly comprehensive enough, but the mode of taking the C. was slow, cumbrous, and unsatisfactory. It was two years and six months after the beginning of the work when the compilation known as the *Compendium* was sent to congress. In the introduction to this compendium Gen. F. C. Walker, superintendent of the ninth C., says: "There is no reason why, with such modifications of existing laws as would insure that the material should come originally to the census office in proper shape for tabulation, the entire compilation should not be concluded within a year from the date of the first receipt of returns. It is not possible for one who has had such painful occasion as the present superintendent to observe the workings of the census law of 1850 to characterize it otherwise than as clumsy, antiquated and barbarous. The machinery it provides is as unfit for use in the C. of the United States, in this day of advanced statistical science, as the smooth-bore muzzle-loading queen's arm of the revolution would be for service against the repeating rifle of the present time. It ought not to be possible that another C. should be taken under this law; such a thing ought not to be seriously proposed. The country has suffered more than enough already of discredit and of loss on account of the wretched insufficiency and inappropriateness of the provisions of this ill-constructed and outgrown statute." The census of 1880 was also made under the superintendency of Gen. Walker and was extremely elaborate. The published material occupied 22 large volumes, the last of which were not issued until 1889. They contain a large number of maps and diagrams bearing on all branches of statistical inquiry, such as agriculture, health, disease, illiteracy, etc. The last census, that of 1890, was conducted by Mr. Robert P. Porter, who was at the outset subjected to much criticism by the press, because he proposed to require each householder to state whether or not his property was mortgaged, and if so, for what purpose. This was denounced as an infraction of the rights of the individual citizen, and so much popular protest was made that this particular line of inquiry was practically abandoned. The census was taken by 175 supervisors, each in charge of a district, who had under their immediate direction some 80,000 enumerators. More than 80,000,000 blanks were used in making the enumeration, which occupied one week. The official bulletin (corrected) of the population of the states and territories was sent by the Superintendent of the Census to the Secretary of the Interior, Oct. 28, 1890. Unofficial figures had been given out long before, as well as unofficial statements of the population of the chief cities and towns. The work of adding the figures and of reducing them to totals, was much simplified by the extensive use of counting machines. The following figures show the cost of the first ten censuses in round numbers: first, \$44,500; second,

\$66,600; third, \$178,500; fourth, \$209,500; fifth, \$378,500; sixth, \$835,000; seventh, \$1,830,000; eighth, \$1,925,000; ninth, \$3,335,000; tenth, \$4,800,900. The preliminary work of the eleventh census (including the actual enumeration, but not the tabulation or publication of volumes) for the year ending June 30, 1890, was \$977,198, of which sum \$172,000 was spent for printing. The entire cost of the eleventh census will probably not be far from \$8,000,000. The population of the entire country as officially announced Oct., 1890, was 62,480,540, including 244,000 Indians.

The census of Alaska was taken under the direction of a special agent, Mr. Ivan Petroff, who in February, 1890, submitted a plan for census work in Alaska, which was adopted. Under this plan the territory was divided into seven divisions, namely: first, the Southeastern or Sitka division; second, the Kodiak division; third, the Oonalaska division; fourth, the Nushegak division; fifth, the Kushovim division; sixth, the Yukon division; seventh, the Arctic division. Each division was placed in charge of a special agent, a resident of the division. On account of the difficulties encountered by special agents in traveling through Alaska, and the impossibility of obtaining proper vouchers, etc., Congress allowed the sum of \$7 per day to each agent in lieu of subsistence, which should also cover traveling expenses, ordinary enumerators in other parts of the country being paid on the basis of the number of names collected, and at a rate varying with the sparseness of the population in each district. Subsequently Petroff's returns were discarded by the government because of gross frauds. See also UNITED STATES; POPULATION OF THE WORLD; and the Appendix to vol. XV.

**CENT** (Lat. *centum*, a hundred), a coin of the United States valued at the one hundredth part of a dollar. Previous to 1782, when a plan for an American coinage was submitted to congress, the colonies had used almost exclusively the coin of England, or pieces specially issued there for their benefit. In 1783, the "nova constellatio" copper, as it is called from its legend, was struck in England for circulation in America. From 1785 to 1788 Vermont and Connecticut issued copper coins of their own; as did New Jersey, 1786-87, and Massachusetts, 1787-88. In 1787 a mint established by congress at New Haven, Conn., began coining what are now known as the "Fregio" or "Franklin" cents, which were issued for many years. In 1791 a coin bearing a head of Washington and the words "one cent," was struck in England as a pattern piece, and in 1792 another, without the word "cent," both of these meeting with the President's modest disapproval. In 1792, April 2, congress authorized the issue of a copper cent of 264 grains and a half-cent in proportion. These appeared in 1793, the cent being reduced to 208 grains. In 1796, act of Jan. 26, the weight of the cent was reduced to 168 grains and the half-cent was proportionately reduced, a new design being adopted also. The head of Liberty was changed in 1808 and again in 1816. In 1815 and 1835 no copper coins were issued. By act of March 3, 1851, a three-cent coin, three-fourths silver, was authorized, and in 1853 its weight was reduced from 12½ grains to 11.52 grains. By the act of Feb. 21, 1857, the half-cent was discontinued, and the old copper cent was replaced by a smaller coin, composed of .88 copper and .12 nickel, and weighing 73 grains. In 1864, act of April 22, the bronze cent was introduced, weighing 48 grains and consisting of .95 copper and .05 tin and zinc. By the same act the one and two-cent coins were made a legal tender for sums not exceeding 10 cents and 20 cents respectively, and the coinage of two-cent pieces to weigh 96 grains was authorized. In 1865, act of March 3, the one and two-cent coins became each a legal tender to the amount of 4 cents only, and a three-cent coin was authorized, to consist of three-fourths copper and one-fourth nickel, to weigh 80 grains and to be legal tender for any sum not exceeding 60 cents. In 1866, May 16, a new act provided for the coinage of a five-cent piece, three-fourths copper and one-fourth nickel, to weigh 77.16 grains and to be a legal tender for any sum not exceeding \$1. The "coinage act of 1873," Feb. 12, limited the issue of coins of the denomination of cent to a five-cent piece and a three-cent piece (three-fourths copper and one fourth nickel, and weighing 77.16 and 80 grains respectively, and a one-cent piece (.95 copper and .05 tin and zinc, weighing 48 grains). The coins authorized by this act were made a legal tender at their nominal value for any amount not exceeding 25 cents in any one payment. Ten of the present cents weigh just a troy ounce, and 120 cents weigh a troy pound. They cannot be conveniently used for avoirdupois or common weight. The cents issued in 1793, 1799, and 1804, and the copper cent of 1856 are very rare, as are the half-cents of 1793, 1831, 1840-48, and 1852. See NUMISMATICS.

**CENTAUREA**, a genus of plants of the natural order *compositæ*, sub-order *cynaraceæ*, containing many species of annual and perennial herbaceous plants, chiefly natives of the temperate and cold regions of the eastern hemisphere.—The BLUE-BOTTLE, or CORN BLUE-BOTTLE (*C. cyanus*), is common in cornfields in Europe, and indeed over the greater part of the world. The juice of the florets of the disk, with a little alum, dyes a beautiful and permanent blue.—The large blue-bottle (*C. montana*), a native of central Europe, is frequently cultivated in flower-gardens. Its flowers are considerably larger, and it is a perennial.—SWEET SULTAN (*C. moschata*), a native of the Levant, with fragrant flowers, is also common in flower-gardens. It is an annual or biennial.—Several species, having the involucre spiny, bear the name of STAR-THISTLE.—

**CENTAURS** ("bull-killers"), a wild race of men who inhabited, in early times, the forests and mountains of Thessaly, and whose chief occupation was bull-hunting. Homer, the first who mentions them, describes them merely as savage, gigantic, and covered with hair. They do not appear as monsters, half-man and half-horse, until the

age of Pindar. The C. are celebrated in Greek mythology on account of their war with the *Lapithæ* (q.v.), and their contest with Hercules. The fact lying at the bottom of Pindar's myth may refer to the impression which the old bull-hunters of Thessaly, who spent almost their whole life, it is said, on horseback, first made on some of the neighboring tribes—viz., that the man and the horse were one creature, which, at least, we know was the opinion entertained by the Mexicans of the Spanish cavalry. On account of their resemblance to the Satyrs, the C. were at a later period introduced into the artistic representation of the Bacchic worship. See *IXION*.

**CENTAURUS**, the *Centaur*, one of the constellations in the southern hemisphere, represented on the celestial globe by a form half-man and half-horse. The stars in this constellation are, according to Ptolemy's catalogue, 37 in number; according to the Britannic catalogue, 35. It contains the stars  $\alpha$  Centauri and  $\beta$  Centauri, both of the first magnitude.

**CENTAURY**, *Erythraea*, a genus of plants of the natural order *gentianæ*, having a funnel-shaped regular 5-partite corolla. The species are pretty little annuals, natives chiefly of the temperate parts of Europe and Asia, with pink or rose-colored flowers. They possess the tonic and other medicinal virtues of gentian, and although not frequently administered by physicians, are an important domestic medicine; and the tops are collected, when the plant is in flower, by the country people both in England and on the continent of Europe, to be employed in cases of dyspepsia, in intermittent fevers, and as a vermifuge. They contain a substance called *centaurine*, the hydrochlorate of which is said to be an excellent febrifuge.—The common C. (*E. centaurium*) is the species most frequent in Britain; a plant of 8 in. to a foot in height, with flowers collected in loose heads, growing in dry pastures. Two or three other species are found on sandy sea-shores. Nearly allied to these is the AMERICAN C. (*sabbatia angularis*), an annual plant with an erect quadrangular stem, extensively distributed throughout the United States and Canada, and much used in the domestic practice of America, as a prophylactic against autumnal fevers in strong infusions and large and repeated doses. The name C. owes its origin to the same legend with the name *centaurea*, although appropriated to plants so different.

**CENTENARY** (Lat. *centenarius*, from *centum*, a hundred), a hundredth of anything, a period of a hundred years, but usually employed to denote a commemoration of an important event. The centenary of American independence was celebrated by a *centennial* exhibition in 1876; the *bi-centenary* of Pope's birth in 1888; the *ter-centenary* of Shakespeare's birth in 1864; the *octo-centenary* of the Bologna university in 1888.

**CENTE'NES**. See *TENREC*.

**CENTENNIAL EXHIBITION**, in the United States, held at Philadelphia in 1876, a hundred years after the declaration of independence. It was opened in Fairmount Park. May 10, 1876. An area of 236 acres was used, and the cost of the five main buildings was \$4,500,000. Before the close there were more than 200 separate buildings within the inclosure. Some idea of the magnitude of the preparations may be obtained from the apportionment of space in the main building, designed for the exhibition of the manufactured products and products of mines and metallurgy, as well as the condition of science and education in all nations. This building covered 20 acres, and was 1880 ft. long and 464 wide, with projecting wings in the center of the sides 416 ft. long, and in the center of the ends 216 ft. long. The exhibition space was on one floor. The roof of the main portion was 70 ft. high. In the center was an elevated square, with sides of 184 ft., having towers 120 ft. high and 48 ft. square at the corners. At the four corners of the building were towers 75 ft. high. The roof was supported by wrought-iron roof-trusses resting upon 672 wrought-iron columns. The sides were closed with glazed sash, above a substructure of brick 7 ft. high, resting on a foundation of massive masonry. Space was apportioned as follows, in square feet: Argentine Republic, 2,861; Austria-Hungary, 24,727; Belgium, 15,598; Brazil, 6,899; Canada, 24,118; Chili, 8,244; China, 6,628; France, 45,460; Germany, 29,629; Great Britain and Ireland, 54,155; India and British colonies, 24,193; Hawaiian islands, 1575; Italy, 8,943; Japan, 17,831; Luxemburg, 247; Mexico, 6,567; Netherlands, 15,948; Norway, 6,959; Orange Free State, 1058; Peru, 1462; Spain and colonies, 11,253; Sweden, 17,799; Switzerland, 6,693; Tunis, 2,015; Turkey, 8,347; United States, 136,684. Within this vast space the nations vied with each other in showing proofs of their industry, wealth, and greatness. A most interesting part of the exhibition was that devoted to the progress of modern education. Another building was the women's pavilion, covering an acre of ground, designed to receive the products of woman's ingenuity and progress. Besides the United States more than a dozen other nations were here represented. This was the first collective display of women's work ever attempted. The art building was called Memorial hall, and remains as a permanent monument of the exhibition. It is a splendid structure, in the renaissance style. On a central tower 150 ft. high stands a colossal statue of America; at the base are four figures of smaller proportions, representing the four quarters of the globe. The building is 365 ft. long by 210 wide, and 59 high; it is of granite, glass, and iron. Machinery hall, next in size to the main building, was 1403 ft. long by 360 wide, its area, including that of its annex, being nearly 13 acres. Steam, water-power, and

shafting were provided by the commissioners. The United States building was 504 by 806 feet. In it were exhibited, as fully as possible, all the operations of government service, Horticultural Hall, in the Moorish style of the 12th c., was built by the city of Philadelphia, and was intended to be permanent. It is of iron and glass, 888 by 198 ft., and 72 in height. Agricultural hall covered a rectangular space 820 ft. long and 540 wide. Great Britain erected three buildings for the use and entertainment of her commissioners; and Germany, Brazil, and Portugal each had a pavilion. The English buildings were fine specimens of the later Tudor architecture. Sweden exhibited a national school-house with educational appliances and furniture complete. France had a building containing charts, drawings, and models of public works. Canada displayed her woods and lumber in log and frame houses. Spain had a soldiers' barracks, and Cuba had an acclimatization garden. Turkey showed in a special building her sponge fisheries. Japan had a model dwelling. Morocco had a Moorish villa for the display and sale of her productions. Chili had a building containing models of amalgamating machines. There were also a number of special edifices belonging to private exhibitors. There was a Turkish café of true oriental type, where Mocha, mastic, Syrian tobacco, and Samian wine were dispensed. There were a Tunisian bazaar, and an Algerine pavilion; Japanese booths, houses, and gardens; a New England farmer's home with the old style of kitchen, and other peculiar structures. There were 26 buildings for the headquarters of as many states, some of them containing large exhibitions of state products; several were made of the stone or wood of the state represented. Thirty or more buildings were erected by private companies or individuals. Among them were the telegraph building, the transportation building, the bankers' building, the American kindergarten, the Bible building, etc. The exhibition was opened to visitors every day except Sunday for six months, closing on the 10th of November. The number of admissions was 9,910,966, of which number 7,250,630 paid the regular fee of 50 cts., and 753,654 the special rate of 25 cts.; 1,906,682 admissions were free.

**CENTENNIAL HYMN.** See PAINE, JOHN K.

**CENTENNIAL STATE.** See STATES, POPULAR NAMES OF.

**CENTER**, a co. in middle Pennsylvania, traversed by the Allegheny and other mountain ridges, Bald Eagle creek, and several branches of the Pennsylvania railroad; 1145 sq. m.; pop. '90, 43,269. Co. seat, Bellefonte. About 14 miles e. of Bellefonte is a remarkable cave known as Penn's Cave (q. v.).

**CENTER OF GRAVITY** is that point in a body or system of bodies rigidly connected, upon which the body or system acted upon only by the force of gravity, will balance itself in all positions. Though the action of gravity enters this definition, many of the properties of the point are independent of that force, and might be enunciated and proved without conceiving it to exist. By some, accordingly, the point has been called the *center of magnitude*, and by others, the *center of parallel forces*. Such a point exists in every body and system, and only one such point. Every body may be supposed to be made up of a multitude of minute particles connected by cohesion, and so far as its balance under gravity is concerned, each of these may be supposed to be removed, and its place occupied by a force proportioned to its weight. Instead of the body, on these suppositions, we should then have a system of parallel forces, the lines from the various particles to the earth's center being regarded as parallel. But a system of parallel forces (see PARALLEL FORCES) has a single resultant acting through a fixed point, whose position is independent of the position in space of the points of application of the component forces, provided their relative positions in the system continue unchanged. This

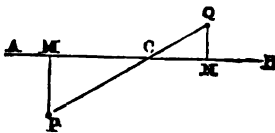


Fig. 1.

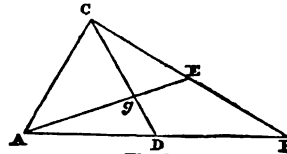


Fig. 2.

point is the C. of G.; and if it be supported, it is clear that the body will balance itself upon it in all positions. The same reasoning obviously applies to any system of bodies rigidly connected. It is usual to demonstrate this and the general rule for finding the C. of G. by proving it first in the case of two heavy particles forming a body or system, and then extending the proof to the case of any number of particles. Let P and Q (see fig. 1) be two heavy particles. Join P and Q, and divide the line PQ in C, so that weight of P : weight of Q :: CQ : CP. Then C will be the C. of G. of P and Q. Draw ACB horizontal, and PM, QN vertical, meeting AB in M and N. Then if P and Q represent the weights of P and Q, we have P : Q :: CQ : CP. But CQ : CP :: CN : CM by similar triangles. Therefore P : Q :: CN : CM, and P.CM = Q.CN. P and Q, therefore are balanced about C. See BALANCE and LEVER. This is true in all positions of P and Q, for no assumption was made as to their positions. C, therefore, is their center of gravity. Also, we may conceive P and Q to be removed (see PARALLEL FORCES), and in their stead a particle at C equal to them taken together in weight. If

now, the system contained three, it is clear how we should proceed to find its center of gravity; having found the C. of G. of two, we should consider the system as formed of two—viz., the equivalent of the first two at their C. of G., and the third, when the case would fall under that already treated; and so on, extending the rule to a system containing any number of particles. Apart from this rule, however, it is possible, in the case of most regular homogeneous bodies, to fix upon their centers of gravity from general considerations. The C. of G. of a straight line, for instance, must clearly be in its middle point. So the C. of G. of a uniform homogeneous cylinder must be in the middle point of its axis. It must be in the axis, for the cylinder clearly is equally balanced about its axis. It must also be somewhere in its middle circular section, for it will balance itself on a knife-edge under that section. It must, therefore, be in the point where that section cuts the axis, or in the middle of the axis. The C. of G. of a uniform material plane triangle may be found from similar considerations. The triangle ABC (see fig. 2) may be supposed to be made up of uniform material lines parallel to its base AB; each of these will balance upon its middle point. The whole triangle, therefore, will balance upon the line CD, which bisects the base AB and all lines parallel to it. In the same way, the triangle will balance upon the line AE, bisecting BC. But if a figure balances itself upon a line, its C. of G. must lie in that line. The C. of G. of the triangle is therefore in CD, and also in CB. It must therefore be at  $g$  where these lines intersect,  $g$  being the only point they have in common. Now, by geometry, we know that  $g$  divides CD, so that  $Cg = \frac{1}{3} CD$ . Hence the rule for finding the C. of G. of a triangle: Draw a line from the vertex, bisecting the base, and measure off  $Cg$ , two thirds of the line.  $g$  is the center of gravity. By a similar method, the C. of G. of a great number of figures may be determined.

The above method applies only where the figure of the body is regular, and its mass homogeneous. But many bodies, besides being irregular, are formed by the agglomeration of particles of different specific gravities. Of these, the C. of G. can be found only by experiment, though not always satisfactorily. Let the body be suspended by a string, and allowed to find its position of equilibrium. The equilibrium being due to the tension of the string counterbalancing gravity, it follows that the tension is in the same line with that on which gravity acts on the body. But the tension acts on the line of the string, which therefore passes through the center of gravity. Mark its direction through the body. Suspending it then by another point, we should ascertain a second line in which lies the center of gravity. The C. of G., then, must be where these lines intersect.—For the effect on the stability of bodies of the position of the C. of G., see STABILITY.

**CENTER OF GYRATION** is the point at which, if the whole mass of a body rotating round an axis or point of suspension were collected, a given force applied would produce the same angular velocity as it would if applied at the same point to the body itself. The C. of G. bears a strong analogy to the center of oscillation. The cases differ only in this, that in the latter the operating forces are supposed to act at every point of the moving body, while in the former there is only one force acting upon one point. The C. of G. is found by the following rule: Divide the moment of inertia of the rotating mass by the mass of the body, and extract the square root of the quotient. The result is the distance of the point from the axis of rotation. The moment of inertia, it may be stated, is the sum of the products of the weight of each point of the mass by the square of the perpendicular distance of that point from the axis.

**CENTERING**, the frame-work upon which an arch or vault of stone, brick, or iron is supported during its construction. The simplest form of C. is that used by masons and bricklayers for the arches of common windows and doors. This is merely a deal-board of the required shape, upon the curved edge of which the bricks or stones of the arch are supported until they are keyed in. In building bridges or other structures where arches of great span are to be constructed, the C. is usually made of framed timbers, or timbers and iron combined. The arrangement of the timbers should be such, that the strain upon each shall be mainly a thrust in the direction of its length, for if the strain were transverse, a comparatively slight force would snap it, and if a longitudinal pull, the whole structure would be no stronger than the joints holding the pieces of timber together. In arches of great span, such as that of Waterloo bridge, London, a longitudinal pulling strain is almost inevitable in some parts, as a beam of great length would bend to some extent under a thrusting strain. In such cases great skill and care are demanded in the designing and construction of the joints. As an arch is built from the piers towards the keystone, the weight upon the haunches during construction tends to push the crown upwards, and therefore the problem of designing a framed C. involves the resistance of this tendency, as well as the supporting of the weight of the materials.

The C. of Waterloo bridge, designed by Rennie, presents a fine example of the fulfillment of these requirements. The weight is resisted by direct thrust upon beams passing obliquely downwards from various parts; one of each pair of these oblique beams thrusts outwards, and is directly supported by the abutments; the other thrusts inwards towards a support equidistant from the abutments, the yielding of which is prevented by the longitudinal pull of lower and longer oblique beams. In this, and other modern structures, cast-iron shoes have been successfully used for the tying joints subject to the

longitudinal pulling strain. The flexible C., so called from its yielding at the joints, and varying its form with the load put upon it, is now abandoned. It was chiefly used by French engineers. That of Perronet for the bridge of Neuilly is a celebrated example.

Occasionally, when a very great span is required, and the navigation will permit, piers are built, or piles are driven, to support the C., and the design is much simplified thereby.

Cupolas like the pantheon and St. Peter's at Rome, St. Paul's in London, or the flat domes of the Turkish mosques, require very effective centerings.

**CENTER OF MAGNITUDE** or **FIGURE** (see **CENTER OF GRAVITY**). C. of M. is the point on which plane figures and curved surfaces would balance themselves, supposing their areas to have weight. Thus, the center of a circle is its center of magnitude. Otherwise, C. of M. or F. is a point so situated that all straight lines passing through it, and terminated by the circumference or superficies of the figure or surface, are bisected in it.

**CENTER OF OSCILLATION**. Referring to the article **PENDULUM**, the reader will see that the time of a pendulum's vibration increases with its length, being always proportioned to the square root of its length. This is strictly true only of the simple pendulum, in which the pendulous body is supposed to have no determinate magnitude, and to be connected with the point of suspension by an inflexible wire without weight. If, however, the vibrating body have a determinate magnitude, then the time of vibration will vary, not with the square root of its length, but with the square root of the distance from the axis of suspension of a point in the body called its center of oscillation.

If each part of the vibrating body were separately connected with the axis of suspension by a fine thread, and entirely disconnected from the rest of the body, it would form an independent simple pendulum, and oscillate as such—the time of each vibration being as the square root of the length of its thread. It follows that those particles of the body which are nearest to the axis of suspension would, as simple pendulums, vibrate more rapidly than those more remote. Being connected, however, as parts of the solid body, they vibrate all in the same time. But this connection does not affect their *tendencies* to vibrate as simple pendulums, and the motion of the body which they compose is a compromise of these tendencies of its particles. Those nearest the axis are retarded by the more remote, while the more remote are urged on by the nearer. Among these particles there is always one to be found in which the accelerating and retarding effects of the rest are mutually neutralized, and which vibrates in the same time as it would if it were unconnected with the other parts of the body, and simply connected by a fine thread to the axis of suspension. The point in the body occupied by this particle is its center of oscillation. By this C. of O. the calculations respecting the vibration of a solid body are rendered as simple as those of a molecule of inconsiderable magnitude. All the properties which belong to a simple pendulum may be transferred to a vibrating body of any magnitude and figure, by considering it as equivalent to a single particle of matter vibrating at its centre of oscillation.

● The determination of the position of the C. of O. of a body usually requires the aid of the calculus. It is always further from the axis of suspension than the center of gravity is, and always in the line joining the center of gravity and the point of suspension, when the body is suspended from a point. The rule for finding it in such a case is: If S be the point of suspension, and O the C. of O.,  $SO = -\frac{\sum (md^2)}{M.Sg}$ ; or it is the quotient obtained by dividing the moment of inertia of the body by the product of its mass into the distance of its center of gravity from the point of suspension.

**CENTER OF PERCUSSION**. The C. of P. of a body or a system of bodies revolving about a point or axis, is that point in it, which striking an immovable object, the whole mass shall not incline to either side, but rest, as it were, in equilibrio, without acting on the center or axis of suspension. If the body be moving freely, then the C. of P. is that point in it at which its whole impetus is supposed to be concentrated. In this case, if the body struck with its C. of P. an immovable obstacle, and if it were perfectly rigid and inelastic, it would come to perfect repose; whereas, if it struck the obstacle with any other point, a rotatory motion would be produced in it. When the body is moving freely, and there is no rotatory motion, the C. of P. coincides with the center of gravity. If the body be moving round a point or axis of suspension, the C. of P. coincides with the center of oscillation. The more complicated case of a body rotating round an axis within it, would require, for its explanation, analytical formulæ which cannot conveniently be translated into ordinary language. There are many positions which the axis may have in which there will be no C. of P.—i.e., there will be no direction in which an impulse could be applied without producing a shock upon the axis. One case of this sort is that of the axis being a principal axis through the center of gravity.

**CENTER OF PRESSURE**. The C. of P. of any surface immersed in a fluid is the point in which the resultant of the pressures of the fluid on the several points meets the surface. When the bottom of a vessel containing fluid, or when a plane immersed in



fluid, is horizontal, a pressure on every point of it is the same, being that due to the weight of the column of fluid standing above the bottom or plane. In either case, the pressures at the different points obviously form a system of equal parallel forces, whose center will be the center of gravity of the bottom or plane, their resultant passing through this point being the sum of all their forces. But when the plane is inclined at any angle to the surface of the fluid, the pressure is not the same at all points, but is obviously greater at the lower than at the upper points, for the lower have to support taller columns of the fluid. The resultant of these forces, then, will not pass through the center of gravity of the surface, but through a point below it. This point is the C. of P., and evidently will lie below the center of gravity for all fluids in which the pressure increases with the depth. If the surface pressed upon form part of the containing vessel, and be supposed movable, it will be kept at rest by a pressure equal to the sum of the fluid pressures applied at the C. of P., and acting in the opposite direction. In the case of a vessel with a parallelogram for one side, the C. of P. is at the distance of one third of the height from the bottom. In the case of a triangular vessel whose base is at the bottom, it is one fourth of the height only.

**CENTERVILLE**, city and co. seat of Appanoose co., Ia., on the Chicago, Rock Island and Pacific, and Keokuk and Western and the Iowa Central railroads, 90 miles s.e. of Des Moines. Coal and limestone underlie the place, and large quantities are shipped. Pork packing and the exportation of live stock are prominent industries, and there are manufactures of lumber, flour, iron, and other articles. There are banks, high school, newspapers, and churches. Pop. '90, 3668.

**CENTIGRADE**. See THERMOMETER.

**CENTIME** (Fr. a hundred), in the French monetary system means the hundredth part of a franc, or two mills.

**CENTIMETER**. See METRIC SYSTEM; also, ELECTRICITY.

**CENTIPEDE**, *Scorpandra*, a genus of *myriapoda* (q. v.), having a long slender depressed body, protected by coriaceous plates, 21 pair of legs, distinct eyes, four on each side, and antennæ with 17 joints. The name is, however, popularly extended to species of nearly allied genera. Centipedes run nimbly, feed on insects, and pursue them into their lurking-places. They have not only a pair of horny jaws, like those of insects, but also another pair of organs closely connected with the mouth, and which are regarded as transformed legs, dilated and united at the base, terminated by a strong hook, and pierced beneath the extremity for the emission of a venomous fluid, which makes their bite quickly fatal to insects, and in the case of the larger species, very painful and even dangerous to the larger animals and to man. The common C. of tropical America (*S. moritans*) is often 9 in. or a foot in length. A species found in the s. of Europe (*S. singulata*) is nearly as large, but its bite does not seem to be equally venomous. Humboldt saw Indian children of the tribe of the Chuymas eat centipedes. See illus., INSECTS, vol. VIII.

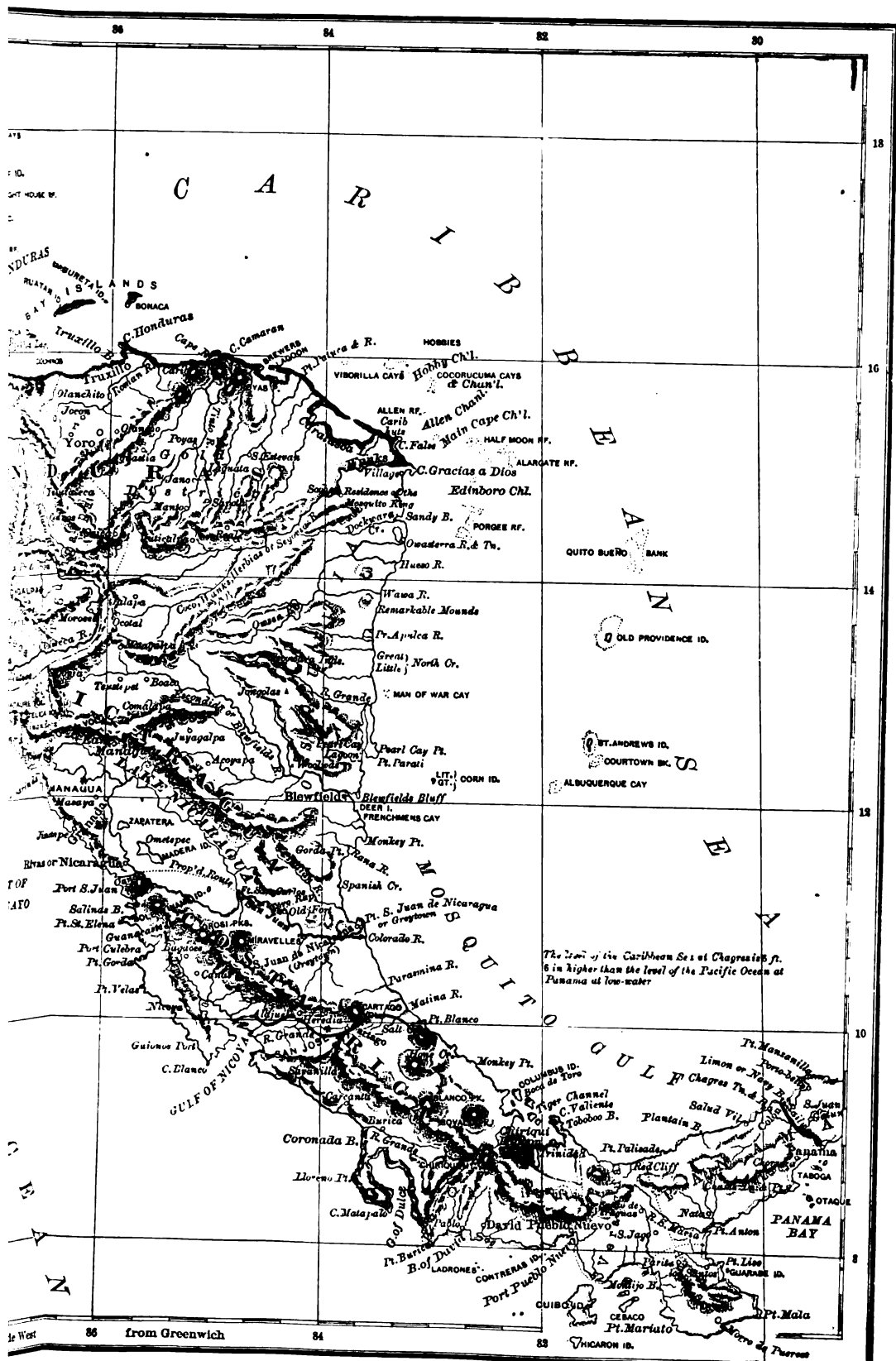
**CENTLIVRE**, SUBANNA, an English dramatic authoress, was the daughter of a Lincolnshire gentleman, named Freeman, b. (most probably) in Ireland, about 1670. Her early history is obscure; but such were her wit and beauty, that on her arrival in London, though a destitute orphan, and only 16 years of age, she won the heart of a nephew of sir Stephen Fox, who, however, died shortly after their marriage. Her second husband, an officer named Carrol, lost his life in a duel. Left in extreme poverty, his widow endeavored to support herself by writing for the stage, and after producing a tragedy called *The Perjured Husband* (performed first in 1700), made her appearance on the stage. She afterwards married (1706) Joseph Centlivre, principal cook to queen Anne, with whom she lived happily until the time of her death, Dec. 1, 1728. Her plays—*The Busybody* (of which the leading character, "Marplot," is highly amusing); *A Bold Stroke for a Wife* (1717); and *The Wonder* (1714)—though not distinguished by purity of style or truthfulness of portraiture, are lively in their plots, and have kept their place on the stage.

**CENTO** (from Lat. *cento*, patchwork), a name applied to literary trivialities in the form of poems manufactured by putting together distinct verses or passages of one author, or of several authors, so as to make a new meaning. After the decay of genuine poetry among the Greeks, this worthless verse-manufacture came into vogue, as is proved by the *Homero-centones*, a patchwork of lines taken from Homer (edited by Teucher at Leipsic, 1793); but it was much more common among the Romans in the later times of the empire, when Virgil was frequently abused in this fashion, as in the *C. Nuptialis* of Ausonius (who gives rules for the composition of the C.), and especially in the *C. Virgilianus*, constructed in the 4th c. by Proba Falconia, wife of the proconsul Adelfus, and giving, in Virgil's misplaced words, an epitome of sacred history! The C. was a favorite recreation in the middle ages. In the 13th c., a monk named Metellus contrived to make a C. of spiritual hymns out of Horace and Virgil.—See *Littérature du Centon*, by M. Delepierre (1875).

**CENTO**, a t. of central Italy, 16 m. n.w. of Bologna, is pleasantly situated on a fertile plain near the Reno. It is celebrated as the birth-place of the famous painter, Guercino, whose house, adorned with paintings, is still preserved; and in the church of C. are many of his works. Pop. about 5,000.









**CENTRAL AMERICA**, that portion of North America included between the isthmus of Tehuantepec and the isthmus of Darien; including the states or republics of Guatemala, Honduras, Nicaragua, San Salvador, Costa Rica, and British Honduras, or Belize. See AMERICA. In 1895 the republics of Honduras, Nicaragua, and Salvador formed a treaty for the purpose of devising means for establishing permanent peace in Central America. A general diet was constituted, and the name of Greater Republic of Central America adopted, which name was to continue until Guatemala and Costa Rica accepted the agreement, when it was to be called the Republic of Central America. Guatemala and Costa Rica formed a treaty of union with the Greater Republic of C. A. in 1897.

**CENTRAL CITY**, city and co. seat of Gilpin co., Col., on the Union Pacific railroad, 40 m. w. of Denver. It is the centre of supply for a rich mining district; is engaged in gold mining, milling, and smelting; and has national banks, public school library, and newspapers, manufactures mining tools and machinery. Pop. '90, 2480.

**CENTRAL FORCES** are those which cause a moving body to tend towards some point or center, called the center of force or motion. The doctrine of C. F. has for its starting-point the first law of motion—viz., that a body not acted on by any external force will remain at rest, or move uniformly in a straight line. It follows from this law that if a body in motion either changes its velocity or direction, some external force is acting upon it. The doctrine of C. F. considers the paths which bodies will describe round centers of force, and the varying velocity with which they will pass along in these paths. It investigates the law of the force round which a body describes a known curve, and solves the inverse problem, and many others, the general statement of which could convey no clear idea to the unmathematical reader. As gravity is a force which acts on all bodies from the earth's center, it affords the simplest general illustration of the action of a central force. If a stone be slung from a string, gravity deflects it from the linear path which it would otherwise pursue, and makes it describe a curved line which we know would, in vacuo, be a parabola. Again, the moon is held in her orbit round the earth by the action of gravity, which is constantly preventing her from going off in the line of the tangent to her path at any instant, which she would do, according to the first law of motion, if not deflected therefrom by any external force. To that property of matter by which it maintains its state of rest or motion, unless acted upon by other matter, has been given the name *inertia*.

We will now explain how, through the action of a central force, a body is made to describe a curved path. Suppose it to have moved for a finite time, and conceive the time divided into very small equal parts; and instead of the central force acting constantly, conceive a series of sudden impulses to be given to the body in the direction of the center, at the end of each of the equal intervals, and then observe what, on these suppositions, will happen. Let S (see Fig. 1) be the center, and let the original motion be from A, on the line AB, which does not pass through S. In the first interval, the body will move with a uniform velocity, say from A to B. In the second, if acted on by no force, it would move on in AB produced to c, Bc being = AB. But when it arrives at B, it receives the first sudden impulse towards S. By the composition of velocities (q. v.), it will move now with a new but still uniform velocity in BC instead of Bc, BC being the diagonal of the parallelogram of which the sides represent its impressed and original velocity. Having reached C at the end of the second interval, it receives the second impulse towards S. It will now move in CD instead of in BC produced. If, then, we suppose the periods of time to be indefinitely diminished in length, and increased in number, the broken line ABCD will become ultimately a continuous curve and the series of impulses a continuous force.

Going back, however, on our suppositions, we may here establish Newton's leading law of central forces. That the body must always move in the same plane, results from the absence of any force to remove it from the plane in which at any time it may be moving. The triangles ASB and BSC are clearly in the same plane, as the latter is on that in which lie the lines Bc and BS. Also, since the triangles ASB, BSc are equal, being on equal bases, AB, Bc, and triangle BSC = triangle BSc, as they are between the same parallels, cC and BS, it follows (by Euclid I. 37) that ASB = BSC. So BSC = BCD; and so on. In other words, the areas, described in equal times by the line (called the radius vector) joining the center of force and the body, are equal. As this is true in the limit, we arrive, by the composition of the small equal areas, at the law: that the areas described by the lines drawn from the moving body to the fixed center of force, are all in one plane, and proportional to the times of describing them. Very few of the laws of C. F. are capable of being proved like the preceding, without drawing largely on Newton's lemmas, with which we shall not suppose the reader to be acquainted.

**Centrifugal and Centripetal Force.**—We have shown that a body continually drawn to a center, if it has an original motion in a line that does not pass through the center, will describe a curve. At each point in the curve, it tends, through its inertia, to

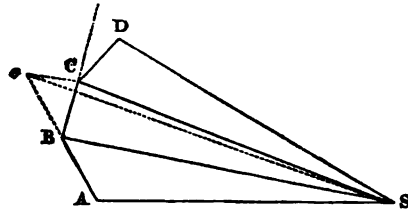


Fig. 1.

recede from the curve, and proceed in the tangent to it at that point. It always tends to move in a straight line in the direction in which it may at any time be moving, and

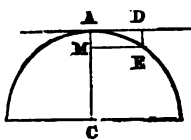


Fig. 2.

that line, by the definitions of a tangent and of curvature, is the tangent to the curve at the point. At the point A (see fig. 2), it will endeavor to proceed in AD: if nothing hindered it, it would actually proceed in that line, so as, in the time in which it describes the arc of the curve AE, to reach the point D, and thus recede the length DE from the curve; but being continually drawn out of its direction into a curve by a force to a center, it falls below the point D by the distance DE. The force which draws it through this distance is called the centripetal force, and that which would make it recede in the same time through the distance DE from the curve is called the centrifugal force. It may be remarked that the centrifugal force is not, like the centripetal, an impressed or external force acting on the body. It is simply the assertion of the body's inertia under the circumstances produced by the centripetal force.

Many familiar illustrations will occur to the reader of the action of what is called the centrifugal force. A ball fastened to the end of a string, and whirled round, will, if the motion is made sufficiently rapid, at last break the string, and fly off. A glass of water may be whirled so rapidly that, even when the mouth is pressed downwards, the water will still be retained in it, by the centrifugal force pressing it up against the bottom of the glass. The centrifugal action will be found to increase with the velocity. In all cases of a body moving in a circle, the force, it can be proved, varies as the square of the velocity of the body at the moment, and in the inverse ratio of the radius. As in this case the velocity varies as the radius inversely, it follows that the force is as the inverse cube of the radius. As in the case of circular motion the body always is at the same distance from the center, it follows that the centrifugal and centripetal forces are equal at all points of a circular orbit. The general law for all orbits is, that the centrifugal force varies as the inverse cube of the distance from the center. As the attractive force of gravitation varies as the inverse square of the distance, it may hence be shown that the centrifugal force gives perfect security, notwithstanding the constant attraction of the sun, that the planets, so far as that attraction is concerned, will never fall into the sun.

The doctrine of C. F. owes more to Kepler and sir Isaac Newton, of whose philosophy it makes a considerable branch, than to all the rest of the philosophers, though almost all the leading mathematicians have contributed to it. The doctrine of centrifugal forces was first mentioned by Huygens, at the end of his *Horologium Oscillatorium*, published in 1673; but Newton was the first who fully handled the doctrine, at least so far as regards the conic sections.

**CENTRAL HEAT** involves the theory that the temperature of the earth increases from its surface towards its center. Observations in mines and in boring artesian wells seem to justify such a conclusion, and the inference therefore is that the solid earth is a mere crust, at most but a few miles thick, within which all matter must be in a state of fusion. Observers have estimated the increase of heat at  $1^{\circ}$  F. for 50 to 60 ft. of depth. Eminent philosophers, however, reject the theory, and attribute the phenomena to local heat. They argue that if such a mass of fire existed in the interior the crust would soon be melted. Some contend that if the earth ever cooled from a state of fire to its solid form, the cooling must have commenced in the center. The most that can be said is that it is still an open question, while experiments and indications seem to favor the theory of a fiery and fluid interior.

**CENTRALIA**, a city in Marion co., Ill., on the Illinois Central and several other railroads; 112 m. n. of Cairo. There are repair shops of the Illinois Central railroad, coal-mines, iron and steel works, public library, several public parks, high school, national bank, daily and weekly newspapers, and a large fruit trade. Pop. '90, 4763.

**CENTRAL INDIA POLITICAL AGENCY**, the official name for a group of feudatory states in the middle of India, the principal of which are Gwalior (Scindiah), Indor (Holkar), Rewah, and Bhopal. The total number, great and small, comprised in the C. I. P. A. is 71; covering about 90,000 sq. m., and having a pop. of 8,000,000. These states have nothing in common except a diplomatic connection with Great Britain.

**CENTRALIZATION**, a term which has lately come into general use for expressing a tendency to administer, by the sovereign or the central government, matters which had been previously under local management. We cannot properly use the term towards an established despotism, for there everything is already directed from the center. The legitimate application is to a state of change from local to central management—a change in the opposite direction would, on the same principle, be called localization. Of this latter change, however, it can scarcely be said that we have any recent example, unless it may be found in the systems of self-government lately communicated to some of the British colonies. Ever since the existing European states began to grow out of

the chaos of the fall of the Roman empire, there has been a continued progress in centralization. That empire itself was, however, the greatest instance of C. which the world has yet seen. In it the numerous municipalities and other local organizations originally existing in Italy, and communicated to the colonies, were entirely centralized. The empire, such as it had been in the days of Constantine, was the type after which the European monarchs, such of them especially as became more powerful than their neighbors, were ever striving; and a few of them, such as Charlemagne, and, long afterwards, Charles V., seemed to have almost restored it. In Gt. Britain, we trace C. from the time when there were about a dozen kings in Britain, and perhaps as many in Ireland, till the united kingdom came under the rule of one monarch. A subsidiary C. at the same time made silent progress, absorbing the feudal power of the aristocracy and the municipal privileges of the corporations. In other countries—as, for instance, in France, notwithstanding her desperate struggles for freedom, this process of C. has tended to a pure irresponsible despotism. With so sad a result before their eyes, a distrust of C. has not unnaturally been felt by some inhabitants of Great Britain. But the British constitution possesses a grand remedy, which turns the process to good use instead of mischief. While administrative authority has been centralizing in the crown, the controlling power of parliament has been increasing at a more rapid ratio, so that the vesting of a function in the crown or central government, means the putting it under the control of parliament, and especially of the people's representatives in the house of commons. There is nothing done in any of the offices under the government for which a secretary of state, or some other member of the ministry, may not at any time be called to account in parliament. The efficiency of this control was in a manner proved by one or two instances in which offices with central powers were created, without being connected with any of the great state departments. There were, for instance, the English poor-law board, and the board of health. Both created much discontent and outcry about C., and it was found necessary to transfer their functions to the great government departments, the heads of which are immediately responsible to parliament. It is not the policy of this country in any case to abolish local management, but rather to aid and direct it from the central authority.

**CENTRAL PARK.** See NEW YORK CITY.

**CENTRAL PROVINCES,** a chief commissionership of British India, with an area of 115,936 square miles, and a population (1891) of 12,945,000. The chief-commissionership was constituted in 1861, when the territories previously known as the Nagpur province and the Sagar and Nerbudda territories were united under the name of the Central Provinces. This tract comprising almost every variety of soil and physical aspect, inhabited by races of very diverse origin, is bounded n. by the feudatory state of Rewah, the small native states of Bundelkhand, and by the district of Latatpur in the Northwest Provinces; on the n. and e. by the Chhota Nagpur division, the Oressa tributary states, and the n. districts of Madras; on the s. by the Godavari district; and on the s.w. and n.w. by the states comprising the Central India Political Agency. The Central Provinces are separated into four divisions, or commissionerships: Nagpur, Jabalpur, Nerbudda, and Chhatisgarh, comprising 18 British districts; and there are several native states, having a total area of 29,435 sq. m. The country is intersected by the Great Indian Peninsula and the East Indian railroads.

**CENTRIFUGAL,** a machine employed in the process of clarification (q.v.). It consists of a circular vessel provided with an outlet in the centre and also at the circumference. The vessel is so constructed as to be capable of being made to revolve at a very high rate of speed. When the muddy liquid is placed in the vessel and the whole caused to revolve, it is found that the particles of dust, mud, or other matter fly to the circumference, leaving the liquid in the centre practically clear. By suitable arrangements the clear liquid can be drawn off.

**CENTRIFUGAL AND CENTRIPETAL** are terms used in botany to designate two different kinds of inflorescence, or modes of flowering of plants. When the flower-bud which terminates the floral axis, and is central in the inflorescence, is the first to expand—in which case the others are developed in succession from the center outwards—the inflorescence is said to be *centrifugal*. When the outermost flowers expand first, the inflorescence is *centripetal*, as is the case in catkins, spikes, and racemes, in which the flowers nearest the base are the first to expand, and those nearest the apex the last. These modes of inflorescence are very characteristic of different plants, of genera, and of orders.

**CENTRIFUGAL FORCE.** See CENTRAL FORCES.

**CENTRIPETAL FORCE.** See CENTRAL FORCES.

**CENTUMVIRI,** judges among the Romans appointed to decide common causes among the people. Three were chosen in each tribe. The extent of their jurisdiction is not clearly understood, but it was probably confined to unimportant causes.



**CENTURIATORS OF MAGDEBURG.** See **MAGDEBURG CENTURIES.**

**CENTURION**, a Roman infantry officer who originally commanded a hundred men, but afterwards an indefinite number. They were of two grades, and were chosen by the tribunes. Their duties were to drill the soldiers and appoint them tasks; and they had power to punish for minor offenses.

**CENTURY PLANT.** See **AGAVE.**

**CEOS.** See **ZEA.**

**CEPHALALGIA.** See **HEADACHE.**

**CEPHAË'LIS.** See **IPECACUANHA.**

**CEPHALASPIS**, a genus of fossil ganoid fishes, of which six species have been described, two belonging to the upper Silurian and four to the Devonian measures. The head was protected by a large ganoid plate, sculptured externally with circular radiating markings. Agassiz gave the name *C.* (buckler-headed) from this extraordinary covering, which has very much the appearance of, and was formerly supposed to be, the cephalic shield of an *asaphus*. The body was covered with rhomboidal enameled scales, and furnished with dorsal and pectoral fins: it terminated in a large heterocercal tail. In a graphic description of this fossil in his *Old Red Sandstone*, Miller thus sketches the general appearance of the animal: "Has the reader ever seen a saddler's cutting-knife—a tool with a crescent-shaped blade, and the handle fixed transversely in the center of its concave side? In general outline, the *C.* resembled this tool, the crescent-shaped blade representing the head, the transverse handle the body." See *illus., SILURIAN AND DEVONIAN FOSSILS*, vol. XIII.

**CEPHALIZA'TION**, a word used to indicate the degree in which the head, or, more accurately, the brain, dominates over the remainder of the animal structure. The distinction between a higher and a lower cephalization may be indicated thus:

**SUPERIOR CEPHALIZATION.**

More of the anterior appendages serve the head, in supplying food, etc.

The structure of the head is compacted, and its form abbreviated.

The posterior part of the body is abbreviated and compacted.

The anterior extremity tends upward; finds its limit in man, and is erect.

**INFERIOR CEPHALIZATION.**

Fewer of the anterior appendages serve the head.

The structure of the head is loose and imperfect; the form is elongated and enlarged.

Great length of tail shows inferiority of grade.

The anterior extremity tends downward, finds its limit and is horizontal in the fish.

Degradation often extends to the absence of essential parts, as teeth, limbs, senses, and is often indicated by gross enlargement of mass, accompanied by stupidity and sluggishness.

Degrees of cephalization may be illustrated by the subdivisions of the mammalia, beginning with the lowest: 1. The mutilates, in which the limbs are wanting, or are degraded to fins; as whales, dolphins, etc.: 2. Herbivores, or plant-eaters; as the elephant, horse, deer, hog, etc.: 3. Carnivores, or flesh-eaters; as the lion, bear, dog, wolf, etc.: 4. Quadrumanes, including monkeys: 5. Bimanes, including mankind. Following this arrangement, as we ascend step by step, we find constant degrees of development corresponding to higher cephalic character, and showing itself in every phase of organized structure. In locomotion, for example, we find the limbs of (1) the mutilates fit only for paddling the body about in the element which gives it support; those of (2) the herbivores carry them from place to place; those of (3) the carnivores carry them about, and serve to grasp and tear their prey; those of (4) the quadrumanes serve for locomotion, for grasping prey, for carrying food to the mouth, and for carrying and defending their young; while in (5) man the fore limbs are relieved from service of locomotion, and are fitted not merely for feeding, for carrying, for defense, but also for an infinity of purposes, to which they are guided by the acuter sensibility of the brain. Similar steps of gradation may be found in other respects, as in the tail, the teeth, the form of the skull, etc. The principle may be further illustrated by the gradations of the lower orders, as in the articulates, going from the worms through the crustaceans to the insects; or in insects, from myriapods through spiders to the true insects; as in the varieties of man, in which the lower races have projecting jaws, retreating foreheads, and enlarged basal brains. With increased brain-force we find diminished jaw, less facial angle, elevated and enlarged forehead, the head generally shortened from front to rear, a larger cavity for the brain, and a greater weight thereof. Finding this constant progression from lower to higher developments, whose exponent is larger and more efficient brain, with nicer adaptation of mechanism for all the functions of life; finding also evidence of a similar gradation in sensation, sensibility, intelligence—everywhere the material more and more subordinated to the immaterial, the body conformed to the spirit, and ruled by it—it is not strange that men should look for a law of development, pervading and controlling all animated nature, or that they should expect to find in this law a formula of the relation between thought and matter, as a function of

the brain. But, while there may be abundant reason for supposing that such a law of relationship might exist, and that if demonstrated it might account logically for a vast and rapidly growing mass of observed facts, it is evident that no such law has yet been proved. Nor, indeed, does it now seem that such a law can be demonstrated without the admission of axioms and postulates, which involve as great strains upon the philosophic imagination as the very principles which such demonstrated law would antagonize and overthrow.

**CEPHALONIA**, or **CEFALONIA**, the largest of the seven Ionian islands (q.v.), is situated at the entrance of the gulf of Lepanto or Corinth, in lat. 38° 3' to 38° 30' n., and long. 20° 21' to 20° 49' east. It is irregular in shape. Its greatest length is about 32 m., and its total area 302 sq. miles. Its surface is mountainous, the soil, for the most part thin, and water very scarce. The inhabitants, however, are industrious and enterprising, and have planted vineyards wherever the grape will grow, and currants and olive-oil are also produced for export. The climate is warm and agreeable. The population in 1839 amounted to 80,178. The numbers who are brought up to the medical profession are remarkable; it is said that there is hardly a town in the Levant which has not a practitioner from Cephalonia. The inhabitants are also much more disposed to engage in foreign trade than those of Corfu or Zante, and own more vessels. C. is subject to many, but slight earthquakes. There was formerly a small English garrison at Cephalonia. Steamers ply between it and Malta, Patras, and Trieste. The language spoken is a Greek dialect. The chief towns are Argostoli (q.v.) and Lixuri.

C. is called by Homer Same or Samos, and during the heroic ages was subject to Ulysses, whose residence was in the neighboring isle of Ithaca (q.v.). Later, C. appears under the name of Cephallenia. It successively fell into the hands of the Athenians, Romans, Byzantines, and Venetians, from the last of whom it was several times wrested by the Turks. On the ruin of the Venetian republic in 1797, it was seized by the French, who were in their turn dislodged by the Russians. In 1809, it came into the possession of England. It was ceded to Greece in 1864.

**CEPHALOPODA** (Gr. head-footed), a class of mollusks, the highest in organization of that division of the animal kingdom. To this class belong the nautilus, spirulæ, argonauts, poulpes, squids or calamaries, cuttle-fish, etc., of the present time, and the ammonites, belemnites, etc., of former geological periods. The C. are all marine, and only a few of them are capable of leaving the water, and moving about in search of food on shore.

The C. receive their name from having organs of prehension and locomotion attached to the head, an arrangement towards which a gradual approach may be traced in the highest gasteropod (q.v.) mollusks. These organs have been variously designated *arms*, *feet*, and *tentacula*. They "have no true homology" with the limbs of vertebrate animals, but are only analogous to them in respect of the purposes which they serve.—The body of the C. is a bag, formed of the *mantle* (see MOLLUSCA), open only at the end to which the head is attached. In some, this bag is almost spherical, and locomotion is accomplished only by the appendages of the head; in others, the body is elongated, and furnished with two fin-like expansions, which are the principal instruments of locomotion. In locomotion by the fins, a cephalopod swims like a fish, with the head first, and often very rapidly; in locomotion by the arms, it draws itself along, laying hold of any object within reach by means of suckers, with which the arms are furnished. Some C. are capable also of moving backwards through the water by alternate contractions and expansions of a muscular web which unites the bases of the arms; some appear to depend for a similar power of swimming backwards upon the forcible ejection of water from the "funnel" below the eyes.

The head of a cephalopod is roundish, generally furnished with two large and prominent eyes, very similar in structure to those of vertebrate animals. There are also ears, but they consist merely of little cavities, one on each side of the brain, in each of which is suspended a membranous sac containing a small stone. The organs of smell are not very certainly known, but it appears that the C. possess this sense, as well as that of taste, of which the character of the tongue is much more indicative than in many vertebrate animals.—The brain forms a ring around the gullet. The whole nervous system is more complex than in the lower mollusks.—The mouth opens in the midst of the circle of arms. It is furnished with a strong horny beak of two mandibles, moving vertically, not unlike the bill of a parrot, but the upper mandible the shorter of the two.—The digestive apparatus is very complicated. The gullet swells out into a crop, and there is a gizzard as muscular as that of a bird. The intestine, after a few convolutions, terminates in the cavity which contains the gills, at the base of the funnel by which the water is ejected after having supplied air for respiration. This cavity is situated within the mantle or bag, and separated from the other viscera by a membranous partition. Into it the water is freely admitted by means of a slit or valvular opening, being drawn in by muscular action, and again expelled with considerable force through the funnel, which opens at the neck, and with its current all secretions, eggs, and excrements are carried forth. There are only two gills in the greater number of existing C., the only exceptions being the two or three known species of *nautilus*, which have four gills; and

two-gilled C.—the order *dibranchiata*—are in many respects of higher organization than the four-gilled—the order *tetrabranchiata*—which, although containing so few recent, contains a vast number of fossil species. Each gill consists of many membranous plates, fixed to two sides of a stalk.—The heart in the *tetrabranchiata* consists of a single ventricle only; but besides this *systemic* heart, the *dibranchiata* have two *branchial* or *respiratory* hearts, contractile reservoirs, one for each gill, by which the blood is forced into these organs.

The “arms” or “feet” are very numerous in the *tetrabranchiata*, not provided with suckers, but hollow, and with long retractile tentacula; in the *dibranchiata* they are only eight or ten in number, furnished with suckers (*acetabula*); two of them, when they are ten in number, being much longer than the rest, and differing from them in form. The suckers are very admirably constructed—an adhesive disk of muscular membrane, often having a cartilaginous circlet, capable of most exact application to any object, with an aperture in the center leading into a cavity, the bottom of which can be retracted like a piston so as to form a vacuum, and render the adhesion of the sucker close and firm, whilst on the muscular action being interrupted or reversed, it immediately lets go its hold. The poulpe has each of its eight flexible arms crowded with 120 pairs of such suckers, and as an animal of this kind exists on some tropical shores, with arms about 2 ft. long, it is not wonderful that it is reckoned dangerous. Still more formidable, however, are the hook-squids of the South seas, the two long arms of which have suckers furnished in the center with a hook to enter into the flesh of any creature of which they may lay hold, and so more effectually to secure their prey.

The sexes are distinct in all the cephalopoda. The eggs have a horny covering, and after their extrusion from the parent, become agglutinated into masses of various forms. The young, from the first, very much resemble the mature animals, except in size.

All the *dibranchiata* are provided with a peculiar organ of defense, called an “ink-bag,” which is wanting in the *tetrabranchiata*. This ink-bag is filled with a peculiar secretion, capable of being expelled at will to darken the water, and facilitate the escape of the cephalopod.

The *tetrabranchiate* C. have a chambered shell. See NAUTILUS. The *dibranchiate* C. have no external shell—the shell of the female argonaut (q.v.) being scarcely an exception—but they have an internal shell (cuttle-fish bone, etc.), sometimes merely rudimentary, included between two folds of the mantle, and apparently intended to give support to the soft body of the animal.

The C. are all very voracious, feeding on fish, mollusks, crustaceans, etc. Even a powerful crab is not safe from the attacks of a *dibranchiate* C. little bigger than itself; the arms, so abundantly provided with suckers, seize it, and trammel every movement, whilst the parrot-like beak is strong enough to break the hard shell.

Fossil C. exist in all the strata which form the earth's crust. The order *tetrabranchiata* is almost exclusively a fossil order, being represented by not more than four recent species. With the exception of two genera, *nautilus* and *aturia*, this order is confined to primary and secondary rocks. The two groups into which it is divided are also characteristic of geological epochs. The *nautilida*, with simple or gently undulating septa, and siphuncle central or in the inner margin, belong, with the exception of the two genera just referred to, to the paleozoic rocks. Including a small group which, while it has the siphon on the external margin, has yet simple septa, the *nautilida* are represented by 145 Silurian, 158 Devonian, and 91 carboniferous species. The *ammonitida* have the siphuncle always on the outer margin of the shell, and the septa with corrugated or lobed margins. This group, with the exception of *goniatites*, a paleozoic genus, is peculiar to, and co-extensive with, the secondary strata. Of the 930 species that have been described, more than the half belong to the genus *ammonites* (q.v.).

The order *dibranchiata* is found first in the lias, and extends through the more recent strata, receiving its full development in our present seas. Scarcely 90 fossil species have been described, while more than double that number are known as recent animals. See AMMONITES, ARGONAUT, BELEMNITES, CALAMARY, CERATITES, CUTTLE-FISH, GONATITES, HOOK-SQUID, NAUTILUS, OCTOPODA, ORTHOCERAS, POULPE, etc.

**CEPHALOPTERA** (Gr. head-wing), a genus of cartilaginous fishes of the ray family, the type of a sub-family, *cephalopterida*. The pectoral fins are very much elongated, so as to give great breadth to the fish. The tail is slender and without fin, but armed near its origin with a great spine. The head is terminated in front by a straight line, and on each side of it there projects a membrane (*precephalic fin*) rolled upon itself, and resembling in shape a pointed horn. The name HORNED RAY has therefore sometimes been given to these creatures, of which only one species, *C. giorna*, has ever been found on the British coasts. It is not uncommon in the Mediterranean, and there acquires a great size; one is mentioned as having been taken off Messina, which weighed 1250 lbs.—more than half a ton. But this is small in comparison with the size of some of the *cephalopterida* which occur in tropical seas: one taken at Barbadoes required seven yoke of oxen to draw it. They are very dangerous to swimmers and bathers.

**CEPHEUS**, a constellation of the northern hemisphere, containing, according to the Britannic catalogue, 35 stars. Its principal star is Alderamin, of the third magnitude.

**CEPHISSUS** is one of the two principal rivers of Athens. Nearly all the rivers of Greece are small, rapid torrents—entirely dry, or a mere chain of pools during the summer months; but the Cephissus has a constant supply of water from the numerous springs on the side of Mount Parnes. Its waters, however, never reach the ocean through the natural outlet, or mouth of the river, since by far the larger portion is diverted into artificial channels for purposes of irrigation; and what little is not exhausted in this use finds an outlet through the long tunnels at the Piræus.

**CEPOLA.** See **BANDFISH**.

**CERACCHI**, GIUSEPPE, 1760–1801; a native of Corsica who was active in establishing a republic in that island in 1798. He took refuge in France, and with others undertook the assassination of Napoleon. The deed was to have been done while the consul was at the opera, Oct. 10, 1800, but there was a traitor among the conspirators, and C. and three others were seized, tried, and executed. C. was a sculptor of some note.

**CERAM'**, an island in the Moluccas archipelago, lies n.e. of Amboyna, between 2° 44' 30" and 3° 30' 30" s. lat., and 129° 30' and 130° 53' e. long., and is divided into Great and Little Ceram by the isthmus of Taruno. Area, 7025 sq. m. Pop. about 100,000. C. belongs to the Netherlands.

**CERAM'BYX**, a Linnæan genus of coleopterous insects, included among those which, on account of the length of their antennæ, are usually known as **LONG-HORNED BEETLES**, and now generally regarded as the type of a tribe or family. To this tribe belongs the musk beetle of England (*callichroma moschata*), remarkable for its strong and agreeable odor, which, however, is nearer that of roses than of musk. Some foreign species have the odor of musk in great perfection. *C. heros* is one of the largest European beetles.

**CERAMIA'CEÆ**, a sub-order of *algæ* (q.v.), also called **FLORIDÆÆ**, and consisting of sea-weeds of a rose or purplish color, with fronds formed of cells arranged in rows, sometimes in a single row; the *sporocarpes* containing cells or *spores*, often in fours (*tetraspores*), with a transparent *perispore*, and inclosed in receptacles of very various form and structure. They are most abundant in the seas of the northern temperate zone. Many of them are very delicate and beautiful. A considerable number furnish agreeable articles of food of a gelatinous nature, as *dulse* (q.v.), *carrageen* (q.v.) or Irish moss, and certain species of *plocaria* (q.v.), which are much used on the sea-coasts of the East Indies. The edible swallows' nests of the east are supposed to be formed of a seaweed of this sub-order, a species of *gelidium*.

**CERAM'IO** (Gr. *keramos*, potter's clay, from *kao*, to burn, and *era*, earth), a term used to designate the department of plastic art which comprises all objects made of clay, such as vases, cups, bassi-relievi, cornices, and the like. See **POTTERY**.

**CERAM'ICUS**, a public ground, or potter's field, outside of the walls of Athens, where citizens killed in war were buried at the expense of the state.

**CERAS'TES**, or **HORNED VIPER**, a genus of serpents of the family *viperidæ*, distinguished by a broad depressed heart-shaped head, the scales of which are similar to those of the back, and particularly remarkable for the development of one of the scales of each eyelid into a spine or horn, often of considerable length. The tail is very distinct from the body. This genus is exclusively African, and very venomous. The only known species, *C. cornutus*, the horned viper of the n. of Africa, was called C. by the ancients, the name being derived from the Greek *keras*, a horn. It was correctly described by the traveler Bruce, but his description was for some time regarded with incredulity. See *illus.*, **REPTILES**, vol. XII.

**CER'ATE** (Lat. *cera*, wax), a compound of wax with other oily and medicinal substances in such proportions as to have the consistence of an unguent (q.v.). Simple C. is made by melting together three parts of white wax, six of olive-oil, and one of spermaceti; they are to be heated together, and stirred into a uniform substance, while cooling.

**CER'ATITES**, a genus of ammonitidæ, peculiar to, and characteristic of, the trias. They are distinguished from the other members of the family by having the lobes of the sutures serrated, while the intervening curves, directed towards the aperture, are simple. Twenty-six species have been described. See *illus.*, **MUSCHELKALK PERIOD**, vol. X.

**CERAUNIAN MOUNTAINS**, a name given by the Greeks to two mountain chains the first being probably the e. extremity of Caucasus; according to Strabo that portion of the Caucasus which looks down upon the Caspian sea, where he locates the land of the Amazona. The second, called also "Acroceraunian," extended along the coast of the Ionian sea. These mountains were often mentioned in ancient poetry. The chain is now called Khimara, Chimara, or Chinari.

**CERBERUS** (Gr. *kerberos*), in Greek mythology, was the name of the many-headed dog—the offspring (according to Hesiod) of Typhon and Echidna—who guarded the portal of the infernal regions. Later writers describe C. as only three-headed, with the tail and mane composed of serpents, though the poets sometimes encumber him with

100 heads.—A northern constellation, near the hand of Hercules, was named C. by Hevelius.

**CERCA'RIA**, a name formerly given to a supposed genus of *entozoa*, at first, from their minute size, mistaken for *infusoria*, but now known to be the young of *trematode worms*. In the form to which the name C. was given, these creatures consist of an oval body with a thread-like tail; and swim about with great activity in water, but exhibit a strong instinctive propensity to penetrate into the soft bodies of insect larvæ, which they do by means of a spine-like weapon projecting from their head. The tail, as no longer needed, is now left behind, the closing of the wound through which the C. enters apparently nipping it off. Within the body which it enters, the C. loses also its spine, becomes encysted, and awaits its passive migration into an animal of higher kind, there to become a trematode worm. When it does not succeed in finding, in due time, a larva into which to enter, the C. gathers itself up into a ball; emits a mucous secretion, which soon hardens; and incessantly turning round within this mucous mass, becomes invested with a sort of shell, in which form it is not unlikely to be swallowed by some vertebrate animal. The C. is not the immediate offspring of a parent like itself. It is generated in a curious little animated sac, which is to be found buried among the organs of fresh-water mullusks, and within which this development of young takes place by gemmation. See GENERATIONS, ALTERNATION OF.

**CERCELÉE**, or **RECECELÉE**, in heraldry, is a cross circling, or curling at the ends, like a ram's horn.

**CER'UIS**. See JUDAS'S TREE.

**CERCOCE'BUS** (Gr. tail-ape), a genus of monkeys, natives of Asia and Africa, included by some naturalists in the large genus *cercopithecus*. These monkeys have large cheek-pouches, large callosities, and long tails. The species commonly called **MANGABEYS**, or **WHITE EYELID MONKEYS**, are commonly referred to this genus, besides the **CALLITRIX**, or **GREEN MONKEY**, and the **MALBROUK**, or **DOG-TAILED BABOON**.

**CERCOPI'ITHE'CUS** (Gr. tail-ape), a genus of monkeys, containing a large number of species, natives of Asia and Africa, but chiefly of Africa. They are called *guenons* by French naturalists, but they have no common English name more distinctive than monkey. They have cheek-pouches and callosities, and a long but not prehensile tail. A **MONA**, or **VARIED MONKEY** (*C. mona*)—an African species—in the Parisian menagerie, was remarkable not only for the cunning and adroitness with which it searched and rifled the pockets of visitors, but also for the readiness with which it applied a key to the opening of a lock, untied knots, undid the rings of a chain, and performed other similar feats. See *ILLUS.*, **MONKEYS**, vol. X.

**CERDO'CYON** (Gr. cunning-dog), a genus of *canids*, apparently intermediate between true dogs and foxes, natives of South America. They are sometimes called *Aguara foxes*. Their aspect is thoroughly vulpine, as are also their manners. Some of them add to the dispositions of ordinary foxes a singular propensity to steal and secrete brilliant or gaudy objects. A Brazilian species has been known to carry pocket-handkerchiefs into the woods. Some are natives of the coldest parts of South America, and have a rich fur.

**CERDONIANÆ**, a sect of Gnostics, founded by Cerdo, a Syrian, who came to Rome about 140 A.D. They held that there were two primal causes—the perfectly good, and the perfectly evil. The good created the world, is the God of the Jews, and the author of the Old Testament. Jesus Christ is the son of the good Deity: he was sent into the world to oppose evil; but his incarnation, and consequently his sufferings, were mere appearance. Deeming the human body the work of the evil deity, the Cerdonians prohibited marriage, wine, and flesh-eating, and advocated fasting and other austerities. Cerdo rejected the Old Testament, and all of the New, except a part of Luke's gospel and Paul's epistles.

**CERE**. See **BILL**.

**CERE'A**, a t. of n. Italy, about 19 m. s.e. of Verona. It is a straggling place, with the remains of an old castle. Pop. 7000. The Austrians defeated the French here in 1798.

**CEREA'LIA**, or **CE'RÉAL GRASSES**, so named from Ceres (q.v.), are the plants which produce grain or corn; in other words, all the species of grass (*gramineæ*) cultivated for the sake of their seed as an article of food. They are also called corn-plants or bread-plants. They do not belong to any particular tribes of the great order of grasses, but differ from each other botanically, perhaps as much as any plants within the limits of that order. The seeds of the grasses in general being indeed farinaceous and wholesome, the employment of particular species as bread-plants seems to have been determined chiefly by the superior size of the seed, or by the facility of procuring it in sufficient quantity, and of freeing it from its unedible envelopes. Some of the grains, as wheat and barley, are produced in ears or close-set spikes; some, as a few of those called millet, in spike-like panicles; others, as oats and rice, in very loose panicles. The form and size of the grains vary not a little, some being roundish, and some elongated; maize is the largest; many of the millets are very small. The plants themselves vary in size

almost as much as their seeds, the millets being the smallest, and maize the largest of ordinary corn-plants.—Buckwheat and spurry are sometimes ranked with the C., but incorrectly, if the term is regarded as having any botanical limits, for they are not grasses; but their seeds are used in the same way. The quinoa of South America, and the kiery (*amaranthus*) of India, with other plants of different orders, might be added to the list on the same account; even the lotus of the Nile, the *Victoria regia*, and other species of water-lilies might thus be reckoned as cereal plants. The most extensively cultivated grains are wheat (*triticum*), barley (*hordeum*), rye (*secale*), oats (*avena*), rice (*oryza*), maize or Indian corn (*zea*), different kinds of millet (*setaria*, *panicum*, *paspalum*, *pennisetum*, and *penicillaria*), and durra or Guinea corn (*sorghum* or *andropogon*). These have all been cultivated from time immemorial, and there is great uncertainty as to the number of species to which the many existing varieties belong; their original forms and native countries cannot confidently be determined. Barley, oats, and rye are the grains of the coldest regions, the cultivation of the two former extending even within the arctic circle. Wheat is next to these, and in the warmer regions of the temperate zone its cultivation is associated with that of maize and rice, which are extensively cultivated within the tropics. The millets belong to warm climates, and durra is tropical or sub-tropical. Rice is the food of a greater number of the human race than any other kind of grain. Maize has the greatest range of temperature.—Besides these, other grasses are cultivated to some extent, in different parts of the world, for the grain they yield.

**CEREBELLUM.** See **CEREBRUM**.

**CEREBRATION**, UNCONSCIOUS, is the non-voluntary working out and reproduction of ideas under certain nerve conditions. There can be no doubt that molecular changes in the cerebrum accompany all our conscious mental processes. The doctrine of unconscious cerebration, as stated by Dr. Wm. B. Carpenter (q.v.), Laycock (q.v.), and others, holds that similar changes may go on in the cerebrum without any consciousness on our part, until the fully elaborated mental result is presented. It is an every-day experience that after one has been in vain trying to recall some name or incident, it will suddenly flash into the mind when one is thinking of some entirely different subject. According to Carpenter, the cerebrum, put in action by our consciousness, has gone on working automatically but unconsciously, until the processes accompanying the mental operation of remembering the name or incident have been completed. This is the physiological statement corresponding to the psychological doctrine that the mind may undergo modifications without being conscious of the process until the new combination is presented to consciousness. See **SUBCONSCIOUS**.

**CEREBRINE**, or **CEREBRIC ACID**, is an organic acid of very complex composition, found in the liver, blood, and nerves, but especially the brain of animals.

**CEREBRO-SPINAL FLUID.** There is an interval, termed the *sub-arachnoid space*, lying between the two innermost of the membranes of the brain and spinal cord—viz., the arachnoid and the pia mater. This space, which is narrow on the surface of the cerebral hemispheres, but is comparatively wide at the base of the brain between the two middle lobes of the cerebrum, and, posteriorly, between the hemispheres of the cerebellum and the medulla oblongata, is occupied by the cerebro-spinal fluid, which fills up the interval between the arachnoid and pia mater, and keeps the opposed surfaces of the former membrane (which is a closed serous sac) in contact. The cerebro-spinal fluid is a clear, limpid, slightly albuminous fluid, having a saltish taste, and a faintly alkaline reaction, and not containing more than 1.5 per cent of solid matters. It varies in quantity from 2 to 10 ozs., and is said to be most abundant in aged persons. Its chief use is to afford mechanical protection to the nervous centers.

**CEREBRO-SPINAL MENINGITIS.** See **MENINGITIS**.

**CEREBRUM-CEREBELLUM.** Cerebrum (Lat. the brain) is sometimes applied to the whole contents of the cranium or skull; but more usually it denotes the upper portion, while the under and posterior portion is called the **CEREBELLUM**, or little brain. In this article we shall briefly notice the chief results which have as yet been obtained regarding the uses of the various parts of the mass, referring to the article **BRAIN** for the necessary anatomical details.

The *crura cerebri* appear as the principal conductors of impressions to and from the cerebrum. When one is divided, the animal moves round and round, from the injured towards the sound side, as if from a partial paralysis of the latter side. The effect may be referred to the interruption of the voluntary impulses from the C., for although the cerebellum seems to have the office of combining the muscles, whose co-operation is necessary for each action, the effort of the will must proceed from the cerebrum.

The *corpora quadrigemina* are, as stated in the article **BRAIN**, "analogues of the optic ganglia of the lower animals." Their removal wholly destroys the power of seeing, and diseases by which they are seriously affected are usually accompanied with blindness. Disease or destruction of one *corpus quad.* produces blindness of the opposite eye. Probably their connection with vision is not their only function.

The *optic thalami* probably participate slightly in the visual function of the *corpora quadrigemina*; but we have no definite evidence on this point. They are intimately connected with the power of movement. Destruction of one of them causes rotation of the animal, similarly to division of one of the *crura cerebri*. Longet has shown, that

after removing all the cerebral hemispheres and the *corpora striata*, the animal can still stand and walk, but that on removing one of the optic thalami, it falls down paralyzed on the opposite side, or commences rotatory motion.

The function of the *corpora striata* is very uncertain; they have probably some connection with sensation and volition, the precise nature of which is at present unknown.

The parts hitherto considered—including the cerebellum—appear to comprise the apparatus (1.) For the direction and government of all the unfelt and involuntary movements of the parts which they supply; (2.) For the perception of sensations; and (3.) For the direction of such instinctive and habitual movements as do not require the exercise of any reasoning or intellectual act. They cannot be regarded as organs of the higher faculties of the mind.

The functions of the *cerebral hemispheres* are, in the words of Dr. Kirkes (*Handbook of Physiology*), those of organs by which the mind, 1<sup>st</sup>, perceives those clear and more impressive sensations which it can retain and judge according to; 2<sup>d</sup>, performs those acts of will, each of which requires a deliberate, however quick, determination; 3<sup>d</sup>, retains impressions of sensible things, and reproduces them in subjective sensations and ideas; 4<sup>th</sup>, manifests itself in its higher and peculiarly human emotions and feelings, and in its faculties of judgment, understanding, memory, reflection, induction, and imagination, and others of the like class.

"The evidences that the cerebral hemispheres are, in the sense and degree indicated above, the organs of the mind, are chiefly these: 1. That any severe injury of them, such as a general concussion, of sudden pressure by apoplexy, may instantly deprive a man of all power of manifesting externally any mental faculty; 2. That in the same general proportion as the higher mental faculties are developed in the vertebrate animals, and in man at different ages, the more is the size of the cerebral hemispheres developed in comparison with the rest of the cerebro-spinal system; 3. That no other part of the nervous system bears a corresponding proportion to the development of the mental faculties; 4. That congenital and other morbid defects of the cerebral hemispheres are, in general, accompanied with corresponding deficiency in the range or power of the intellectual faculties and the higher instincts." See MIND, THE HUMAN.

*Cerebellum*.—The functions of this organ have been made the subject of much discussion and investigation. It is itself insensible to irritation, and has been cut away in various animals (by Longet and other French physiologists), without eliciting signs of pain; moreover its removal or disorganization by disease is generally unaccompanied with loss or disorder of sensibility, animals from whom it has been removed being apparently able to smell, see, hear, and feel, as perfectly as before. Flourens seems by his vivisections to have arrived at the correct view regarding the functions of this organ, and his results have been fully confirmed by Longet and others. He extirpated the C. in birds by successive layers. Feebleness and want of harmony of the movements resulted from the removal of the superficial layers; when he reached the middle layers, the animals became restless; their movements were violent and irregular; but they were not convulsed, and their sight and hearing were perfect. By the time that the organ was entirely removed, the animals had completely lost the power of flying, walking, standing, and preserving their equilibrium. When a pigeon in this state was laid upon its back, it could not recover its former position; but fluttered its wings, and saw and tried to avoid a threatened blow. Hence volition, sensation, and memory were not lost, but merely the faculty of combining the actions of the muscles. From a large series of experiments of this kind, subsequently made on all classes of animals, Flourens infers that the C. belongs neither to the sensitive nor to the intellectual apparatus; and that it is not the source of voluntary movements, although it belongs to the motor apparatus; but that it is the organ for the co-ordination of the voluntary movements, or for the excitement of the combined and harmonious action of the muscles.

This view is confirmed by the phenomena observed in certain cases of disease, and to a certain extent by comparative anatomy, for to each of the four classes of vertebrata—if we reckon amphibians and reptiles as a single class—the species whose natural movements require the most rapid and exact combinations of muscular actions are those in which the C. is most developed in proportion to the spinal cord; and if we compare different species of the same class, we usually find the development of the C. to correspond very closely with the perfection and variety of the muscular movements. For example, in the frog the movements are exceedingly simple in character, consisting of little else than flexion and extension of the posterior limbs; and the C. of this animal is extremely small compared with the rest of the brain, being merely a thin narrow band of nervous matter. In the common sea-turtles, the movements of the body are of a more varied character, and the motions of the head and neck are more extensive; and here we have a much more highly developed cerebellum. In the alligator, again, a reptile whose motions closely resemble those of quadrapeds, the C. is still more fully developed.

The influence of each half of the C. is directed to the muscles of the opposite side of the body, and for the right ordering of the movements, the actions of its two halves must be mutually balanced and adjusted; for if the nervous structures uniting one of the halves of the C. with the medulla oblongata and spinal cord be divided, strangely disordered movements occur, the animal falling down on the side opposite to that which







**CEREMONIES.**—1, 3. Sacraments of the Roman Catholic Church (15th century). 2. Bis-  
stick (15th century); crucifix (12th century); ciborium (13th century). 6. Prote:  
8. Thurible (12th century); holy water vessel (11th century). 9. Russian baptism





1. 2. Bishop's mitre (1500); bishop's rings (14th century). 4. Death-watch. 5. Processional candle-  
6. Protestant communion service (16th century). 7. Baptism of the Reformed Church (18th century).  
an baptismal ceremony.



has been injured, and continually rotating round the long axis of its body, sometimes for several days, at the rate of fifty or sixty times in a minute. Similar movements have been observed in men in whom one of the crura of the C. has been diseased.

Phrenologists are of opinion, in accordance with the view originally propounded by Gall, that the C. is the seat of the sexual impulse and instincts; but this view has been long abandoned by almost all physiologists, for the reason that it has not been found to be sufficiently supported by anatomical and experimental facts, many of which are indeed directly opposed to it.

Our limited space compels us to leave altogether untouched many most interesting topics in cerebral physiology, as, for instance, the quality of the brain, the plurality of the cerebral organs, etc. The reader who wishes for further information, is referred to Ferrier, *Functions of the Brain* (1886), Ross, *Diseases of the Nervous System* (1883), and a number of interesting papers in *Philosophical Transactions* (1886-87). See also the article BRAIN.

**CEREMONY** (Fr. *cérémonie*; Lat. *cerimonia*, a sacred rite). Almost any act, when performed in a regular, orderly, and formal manner, and when viewed, not with reference to its object, but the mode of its performance, becomes a C.; and the more entirely the attention of the performers is withdrawn from the object of the act, and fixed upon the manner of its performance, the more *ceremonious* does it become. The purely formal character of C. is thus illustrated by Hooker: "The name ceremony," he says, "we do not use in so large a meaning as to bring sacraments within the compass and reach thereof, although things belonging to the outward form and seemingly administration of them are contained in that name." The remark is applicable to the most trivial ceremonies of social life and of state pageantry, as well as to the most sacred rites of religion, for a C. which is its own object would scarcely be entitled to be regarded even as a ceremony. The most empty display has always the ulterior object of imposing on somebody.

Ceremonies may be divided into four classes: 1. Religious ceremonies; 2. Social ceremonies; 3. State ceremonies; 4. International ceremonies.

Religious and state ceremonies will be treated of respectively under their various denominations; see, for the first, LITURGY; MASS; PROCESSIONS; RITE; RITES, etc.; for the second, CORONATION; COURT; COURT, PRESENTATION AT; PARLIAMENT, etc. Social C. will in a great measure fall under the heads COURTESY; ETIQUETTE; FORMS OF ADDRESS; PRECEDENCE, etc.; and international C. under AMBASSADOR; CONSUL; DIPLOMACY, etc.

**CEREOPHIS** (Gr. wax-face), a genus of birds of the family *anatida*, to which the New Holland goose (*O. Nova Hollandia*) belongs. This bird has been known since the southern shores of that country were first visited by navigators. There, and on the adjacent islands, it is found in great abundance; and the earlier navigators easily supplied themselves with fresh provisions by knocking them down with sticks, so little were they acquainted with the danger to be apprehended from man. The cere is remarkably large, whence the name.

**CÉRÈS**, among the Greeks named *Dēmētēr*, daughter of *Chronos* (Saturn), by *Rhea* (Ops), sister of Jupiter, Neptune, Juno, etc. She had the misfortune, along with her other brothers and sister, to be devoured by her father, who, however, vomited her forth again after taking the emetic which Metis gave him. By her brother Jupiter she became the mother of Persephone or Proserpina (q.v.). The chief myth relating to C. tells how her daughter Proserpina was stolen by Pluto, and how the mother wandered far in quest of the maiden. After traveling in human form nine days, and everywhere distributing her gifts to mankind, she excited the pity of Jupiter, by whom Mercury was dispatched to bring back Proserpina from the infernal world, but on the condition that she must spend there a third part (or, as others say, one half) of every year. The myth of C. was symbolical of the growth of grain; some consider that this is intimated in the name Demeter, which is thought to be equivalent to *ge meter*, "Mother Earth." The relations of the worship of C. with agriculture, social order, etc., were expressed in her two great festivals—the *Eleusinia* and the *Theismophoria* (q.v.). C. was especially worshipped in Crete, Delos, Sicily, Asia Minor, Arcadia, Argolis, and Attica. Bulls, cows, pigs, honey-cakes, and fruits were offered to her. Among the Romans, her festivals were styled **CERERIALIA**; and of these, the most interesting was the feast celebrated by the rural population shortly before harvest, when the country people, dressed in white, and crowned with oak-leaves, danced and sang harvest songs in honor of the goddess. The feast in April lasted several days, and was celebrated by games of the circus. C. was represented, most commonly, in a chariot drawn by dragons, having her head crowned with a garland of corn-ears, and holding a torch, a basket, or a poppy in her hand. See illus., MYTHOLOGY, vol. X.; and ELEUSINIAN MYSTERIES.

**CERES**, one of the planetoids (q.v.), and the first of them that was discovered. It was first seen by Piazzi at Palermo, Jan. 1, 1801. He continued to observe its motion till the 18th of Feb., when illness obliged him to discontinue his observations, which, however, sufficed to enable astronomers approximately to calculate its orbit. It was nearly a year after before it again became visible, owing to its approach to the sun.

C.'s magnitude is less than that of the moon; and it looks like a star between the seventh and eighth magnitudes.

**CEREUS**, a genus of plants of the natural order *cactææ* (q.v.), containing about 106 known species, among which are some of the most splendid flowers of that order. One of these is *C. speciosissimus*, one of the most common greenhouse plants in the U. S., and sometimes cultivated even in windows. Its large flowers are of a fine scarlet color, the inner petals with a violet tinge: they spring singly from the younger branches. The fruit, when well ripened, is of a delicious flavor. The plant is a native of Mexico.

**CERIGNOLA**, a t. of Italy, in the province of Foggia, 23 m. s.e. of Foggia. It is divided into two parts—the old and new town, in the former of which a portion of the ancient walls still remain—and is celebrated for the decisive victory obtained over the French by the Spaniards in 1503, and which established the supremacy of Spain in Naples. C. has manufactures of linen, and a trade in cotton and fruits. Pop. about 26,000.

**CERIGO**, one of the smaller of the seven Ionian islands, was anciently called Cythera; is situated in the Mediterranean, and is separated from the coast of Morea by a narrow strait; lat. 36° 28' n., long. 23° e. It has an area of 107 sq. m., with a pop. in 1880 of 5015. With the exception of a few tracts of land, it is a very barren, dry, and mountainous island. In some parts, however, corn, wine, and olive-oil are raised. There are two great caverns in the island—one in the sea-cliff at the termination of the wild glen of Milopotamos; the other known by the name of the cavern of St. Sophia, from a small chapel at its mouth dedicated to this saint, is situated at about one and a half hours' ride from Capeall, the capital of the island. The former cavern is said to be 8 m. in length, and so low that it is necessary to creep, in many places, on hands and knees to explore it. The latter—that of St. Sophia—is a very remarkable one, and possesses singular beauty; it abounds in enormous stalactites of various shapes and great beauty. In ancient times, C. was sacred to Venus, being, according to the old mythology, the island that received this goddess when she arose from the sea.

**CERINTHUS** (abusively named **MERINTHUS**, i.e., a halter), a heretic who lived at the close of the apostolic age, but of whom we have nothing better than uncertain and confused accounts. It is said that he was a Jew by birth, and studied philosophy in Alexandria. From Egypt he passed into Asia Minor, and lived in Ephesus contemporaneously (according to the belief of the church) with the aged apostle John. Tradition tells us that John held the heretic in such detestation, that, on a certain occasion, when he encountered C. in the baths of Ephesus, he immediately left the place, saying to those about him: "Let us flee home, lest the bath should fall while Cerinthus is within." It was believed in the ancient church, that the gospel of St. John was written in opposition to the tenets of C.; and the Roman presbyter Caius (about the close of the 2d c.) supposed that C. had revenged himself by falsely ascribing the authorship of the Apocalypse to St. John—it being in reality his own work! The fathers contradict one another in their accounts of Cerinthus. Some describe him as a complete Gnostic, in which case he would be the earliest recorded teacher of that sect; others say that he held coarse and sensual millenarian views, making the *millennium* (q.v.), with the licentious fancy of an Arab, consist chiefly in "nuptial delights;" and that he believed the Jewish ceremonial law to be in part binding upon Christians. There can be no doubt that C. made use of the Jewish law at least as a symbol for his Gnostic doctrines, and also employed millenarian terms in a symbolical manner; a very natural thing for him to do, on the hypothesis which Neander and others have suggested—that Gnosticism originated, not among the minds which had received a true Hellenic culture, but among the Judaizing sects, whose theosophy was a jumble of the spiritual and the material. C. being the oldest teacher of Judaico-Gnostic principles, there would naturally be a greater incongruity and want of harmony in his language and ideas than characterized Gnosticism at a later period of its development; and subsequent ecclesiastical writers, destitute as all of them were of precise historical knowledge and sound principles of criticism, could hardly avoid misunderstanding a system which is not consistent throughout, but bears evident marks of being formed in a transition epoch.—Paulus *Historia Cerinthi* (Jena, 1799); Neander, *Kirchengeschichte*, vol. i., part 2.

**CERITE**, or **O'CHROITE**, is the *silicate of cerium*. It is found as a mineral in gneiss, at Westmanland, Redderhyttan, and Bastnäs. It contains in 100 parts—silica, 16; peroxide of cerium, 26.55; oxide of lanthanum, 33.88; carbonic acid, 4.62; alumina, 1.68; peroxide of iron, 3.53; lime, 3.56; oxide of manganese, 0.27; and water, 9.1. It occurs in granular pieces of a clove-brown, cherry-red, or gray color, with a white streak, a splintery fracture, an adamantine luster, and is translucent at the edges.

**CERITHIUM**, a genus and the type of a family, *cerithiada*, of gasteropodous mollusca of the order *pectinibranchiata* of Cuvier. The shell is spiral, elongated, and many-whirled, with an oval oblique aperture, which has a short canal in front. The species of this family are numerous, most of them marine, but many inhabiting estuaries and brackish rather than salt water; some are found in lakes and rivers. A few belong to temperate climates, but most of them are tropical, and in mangrove swamps they par-

ticularly abundant. The fossil species are very numerous, almost all limited to the tertiary formations. See BAGSHOT BEDS. See *illus.*, TERTIARY PERIOD, vol. XIV.

**CERIVUM**, is a rare metal found native in cerite (q. v.) and a few other minerals. It is a white metal, has not been obtained in any quantity, is not therefore employed in any manufacture, and forms two oxides and a numerous class of salts.

**CERNUSCHI**, ENRICO, 1821-96; b. Milan, Italy, took part in the revolution of 1848-49; was an ardent republican, and assisted Garibaldi in the defense of Rome. He went to France in 1850 and engaged in banking business; became one of the chief stockholders of *Le Siècle*, in which he discussed economical questions with great ability, opposing the Socialists. This course exposed him to the risk of being shot, first, by the Communists, and, upon their suppression, by a Bonapartist general. Disgusted, he left France and visited Egypt, China, and Japan, collecting and bringing back so many valuable works of art as to make his residence in Paris a veritable museum; returned to Paris in 1873; in 1876 visited England; and in 1877 the United States, where he delivered several addresses on economical questions. He published *Réponses à une accusation portée par M. de Cavour* (1861); *Mécanique de l'échange* (1865); *Contre le billet de Banque, dépositions et notes* (1866); *Illusions des Sociétés co-opératives* (1866); *Discours* (1871); *Or et argent* (1874); *La Question monétaire en Allemagne* (1875); *Silver vindicated* (1876); *M. Michel Chevalier et le bimétallisme* (1876); *Le Bland bill* (1878); *Les Projets monétaires de M. Say* (1879); *Le Bimétallisme à 15½ nécessaire* (1881).

**CEROGRAPHY** (Greek *keros*, wax; *grapho*, I write), is the art of engraving on a copper plate covered with wax, from which a stereotype plate is taken.

**CEROPLASTIC** (Lat. *cera*, wax), the art of modeling in wax. See WAX-WORK.

**CEROSTROTUM**, or CEROTRUM (Lat.), a species of encaustic painting upon horn or ivory, the lines of the design being burned in with the *certrum* or burning needle, and wax introduced in the furrows thus made.

**CEROXYLON**. See WAX PALM.

**CERE'ETO**, a t. of South Italy, in the province of Benevento, situated on a slope of the Apennines, about 22 m. n.e. of Capua. It is a well-built town, with a cathedral, and manufactures of coarse cloth. The district produces good wine. Pop. 6000.

**CERRO DE PASCO**, or PASCO. See CERRO GORDO.

**CERRO GORDO**, a mountain pass on the national road from Vera Cruz to the city of Mexico. April 18, 1847, Gen. Scott, with a United States force of 8500, defeated Santa Anna, the Mexican leader, with 12,000 men, at this place. The Mexican loss was from 1000 to 1200 killed and wounded and 8000 prisoners; that of the other side, 63 killed and 368 wounded.

**CERRO GORDO**, a city of Peru, the capital of the province of Pasco, in the department of Junin. It is in the vicinity of the richest silver mines in the republic; and, standing at an elevation of 14,100 ft., it has, all the year round, the temperature of an English winter. The population is estimated at about 14,000. C. G. is 140 m. to the n.e. of Lima.

**CERRO GORDO**, a co. in n. Iowa, intersected both e. and w., and n. and s. by railroads, and watered by Shell Rock river, Lime Creek and the headwaters of Beaver Dam river; 576sq.m.; pop. '90, 14,864. It is an agricultural region. Co. seat, Mason City.

**CERRO GORDO DE POTOSI**, a mountain in Bolivia, directly s.w. of Potosi, containing very rich silver mines. The summit is 16,150 ft. above sea level.

**CERTALDO**, a market t. of central Italy, is picturesquely situated on the Elsa, about 18 m. s.w. of Florence. It is noteworthy as the residence of Boccaccio, as well as the scene of his death. His house, surmounted with a tower, is still standing, and contains the articles of furniture belonging to the poet's time, and a fresco painting of him by Benvenuto Cellini. Pop. 7,500.

**CERTHIADÆ**, a family of birds, generally placed in the great order *insector* or *passerina*, and tribe *tenuirostres*, although some naturalists have ranked them in the order *scanores*. They mostly live on the trunks and branches of trees, feeding on insects which they find in the crevices of the bark; and many of them alight themselves by their stiff tail-feathers in retaining their position as they search for their food on the perpendicular stem. Their claws are long and sharp; the hind-toe is also elongated, so that they can take firm hold of the bark or of a small branch; and many of them can pass round a horizontal branch, clinging to its under-surface with their backs to the ground. The bill of many is slender and curved; others, however, have a comparatively short and straight bill. The tongue is cartilaginous at the extremity, and so fitted to aid in seizing insect prey. The plumage is usually dull and uniform; but the birds are lively and active in their habits. The species are numerous and widely diffused; they are divided into a number of genera. All of them are small birds.

**CERTIFICATE**, a written testimony to the truth of a certain fact or facts. The law of England recognizes certificates for various purposes. 1. Annual C. of attorneys. See ATTORNEY. 2. C. of appointment of the creditors' assignees to a bankrupt's estate and effects. 3. C. of conformity of a bankrupt. 4. C. of counsel, to enable a pauper to litigate *in forma pauperis*. 5. C. of the judges of the superior common-law courts at

Westminster, which are of various kinds and for various purposes. 6. C. of registry of a ship; which is a copy of what is entered in the registry of the ship in the books of the custom-house. This C. is granted by the collector, comptroller, or principal officer of the customs at the port of registry, and delivered to the captain as a voucher of the character and privileges of the vessel as an American ship.

**CERTIFIED COPY.** See EVIDENCE.

**CERTIORARI** (Latin, to be certiorated, or more accurately and fully informed of), is a writ issued by a superior to an inferior court or to a body acting in a judicial capacity, such as commissioners, magistrates, assessors of taxes, etc. It requires some proceeding pending in the lower court, or the record of some cause terminated where the proceedings were not in accordance with the course of common law, to be sent to the superior court for the purpose of reviewing the same or of removing it before trial and judgment, and is employed both in civil and criminal cases. When used as a means of review of an actual decision it deals with questions of law rather than with those of fact. As, for example, if a board of assessors of taxes should decide that the property of a bank invested in United States bonds could be taxed under the authority of the State, they would have decided a question of law which might, by means of a writ of certiorari, be re-opened before superior tribunals and ultimately before the supreme court. The writ is granted or refused at the discretion of the superior court, and the usual result is that the proceedings below are either quashed or affirmed.

In England, it issues in civil cases, out of the chancery division of the high court of justice, and in criminal, from the queen's bench division of the same court. It is now chiefly used in the latter division, and is the usual mode of correcting excesses of justices of the peace in miscellaneous matters.

**CERTO'SA DI PAVIA, LA**, one of the most celebrated monasteries in the world, situated in the neighborhood of Pavia, and founded, 1396, by Giovanni Galeazzo Visconti, first duke of Milan, to appease his conscience for the murder of his uncle. The church is a splendid structure in the form of a Latin cross, the ground-plan being 249 ft. long by 173 ft. broad. It has altogether 12 chapels, 7 in the whole length of the church, and 5 in the transept, some of which are decorated with fine frescoes and paintings. The richly sculptured façade, designed by Ambrogio da Fossano, named Borgognone, was commenced in 1473. The building is made up of various styles, but the pointed prevails in the interior, which is decorated with frescoes, paintings, etc., by Dan Crespi, Andrea Solari, Campi, and Ambrogio Fossano, and contains a gorgeous high-altar, the mausoleum of the founder, and several monuments.

**CERUMEN.** This term is applied to yellow waxy matter which is secreted by certain glands lying in the external auditory canal, or the passage that leads from the external opening of the ear to the membrane of the tympanum. Its main use, doubtless, is to lubricate this passage. It possesses a peculiarly bitter taste, and some physiologists have believed that in consequence of this property it prevents insects from entering the auditory canal. It is popularly known as ear-wax.

**CERUSE**, or **WHITE-LEAD**, the basis of white oil-paint, is a *carbonate of lead*. It has several other names—krams, Nottingham white, flake-white, etc. Like all other preparations of lead, C. is liable to be acted upon by exhalations from sewers, or by anything which contains sulphuretted hydrogen, in which case it is changed to a dull and leaden hue. Neither will it bear to be mixed with any pigment containing sulphur, such as vermilion. It is supposed that the white oxide of zinc might be substituted for C. as a white pigment with advantage.

**CERUTTI, GIUSEPPE ANTOINE JOACHIM**, 1788-92; a Jesuit and professor in the college of that order in Lyons. Among his works are an *Apology for the Institute of the Jesuits*; a *Memoir of the People of France*; a poem entitled *The Garden of Biets*. He also edited a weekly journal, and was once elected to the legislative assembly.

**CERVANTES SAAVEDRA, MIGUEL DE**, one of the greatest imaginative writers of Spain, was b. of an old Galician family, at Alcalá de Henares, Oct. 9, 1547. He studied at Salamanca, and afterwards at Madrid, where he was placed under the care of a learned theologian, Juan Lopez de Hoyos, who was then professor of belles-lettres in the university. But his natural love of poetry led him to spend most of his time in writing elegies, ballads, sonnets, and a pastoral romance entitled *Filena*. When 22 years old, C. served for some time as valet-de-chambre to cardinal Giulio Aquaviva of Rome. In 1570, he served as a volunteer under the command of the papal admiral, Marco Antonio Colonna, and fought gallantly against the Turks. At the battle of Lepanto, he was maimed for life by a gunshot wound in the left hand. He afterwards took part in various campaigns. Captured by an Algerine squadron, he was made a slave, but was ransomed in 1580, after a four years' captivity. On his return to Spain, he rejoined his regiment in the army sent by Philip II. to support his claims in Portugal, and distinguished himself in the expedition to the Azores. In 1584, he returned to Spain, and retired into private life, to devote his attention to literature. Soon after his publication of the pastoral romance, *Galatea* (1584), he married, commenced writing for the stage, and produced, in the course of a few years, as many as 30 dramatic pieces, of which the tragedy *Numancia* is the most remarkable. During the years 1588-99, he lived in straitened circumstances in Seville. In 1605, he once more appeared as an author, and now



in a sphere exactly suited to his genius. In his immortal work, *Don Quixote*, said to have been written in prison, C. satirized the prevailing taste for extravagant romances of chivalry. The first part of this great satirical work appeared in Madrid, and was received at first coolly, but soon afterwards with loud applause, which, at a later period, was echoed from all parts of educated Europe. *Don Quixote*, though written with a satirical purpose, is throughout pervaded by the true spirit of poetry. With that universality which belongs to the highest genius, C. connected a universal human interest with descriptions of local and temporary characteristics. He did not intend by his *Don Quixote* to burlesque the old Spanish knight-errantry, for, as Mr. Ford remarks (see *Handbook of Spain*, part i., p. 238), "the thing had expired a century before his birth;" but to put an end to the absurd and affected romances which it was then the fashion to read, and which were believed to be true pictures of chivalry. He had also, it is quite clear, another object in view—viz., to show that the deeper and truer and more guileless a nature is, the more will it become the jest and butt of real life; but he likewise teaches us that the pure heart and the high soul obtain a triumph which misfortunes and blunders cannot tarnish; for the knight always "disinterested, generous, elevated, and beneficent," though "the sweet bells of his intellect are jangled and out of tune," maintains throughout a firm hold on our affections and esteem. Charles Lamb has truly said, that readers who see nothing more than a burlesque in *Don Quixote*, have but a shallow appreciation of the work.

Though received with enthusiasm, *Don Quixote* brought no pecuniary reward to the author. He was left in the obscurity and poverty in which he had passed so many years, and vainly endeavored to improve his circumstances. After silence during several years, C. published his twelve *Novelas Ejemplares* (Exemplary Tales), 1613; his *Viage al Parnaso* (Journey to Parnassus), 1614—his next best production to *Don Quixote*; and in the following year he produced eight new dramas, but these were indifferently received. In 1614, a certain Alonso Fernandez de Avellaneda published at Tarragona a so-called continuation of *Don Quixote*, which was made a vehicle of abuse lavished on Cervantes. It appears that C. suffered considerably under these despicable attacks; but he revenged himself in noble style by publishing (1615) the true continuation of *Don Quixote*. Near the close of his career, C. found a patron in the count of Lemos, who relieved his poverty. During the last few years of his life, he resided in Madrid, where he died, April 23, 1616. No stone marks the spot where his remains were interred. His novel, *The Sorrows of Persiles and Sigismunda*, was posthumously published. In 1835, when the house in which the poet had lived in Madrid was rebuilt, a bust of C., by the sculptor Don Antonio Solá, was placed in the front.

Among the several editions of *Don Quixote*, we may mention the splendid one in 4 vols. (Madrid, 1780); that by Pellicer (5 vols., Madrid, 1798); the fourth published by the Madrid Academy, with an admirable life of C. by Navarrete (5 vols., Madrid, 1819); Diego Clemencin's edition, with the most complete commentary (6 vols., Madrid, 1833-39); and a good pocket-edition, published at Leipsic (6 vols., 1800-7). There is but one complete edition of Cervantes' works, that of Rivadeneyra in twelve large volumes (Madrid, 1863-64). The original edition of *Don Quixote* has been reproduced by photography (2 vols., Barcelona, 1871-74). There are altogether one hundred and fifty editions of this novel in the original, and more than three hundred editions in other languages. There exist translations of it in fourteen languages, the last in English being that of Watts (1888). There are nine versions in French, besides numerous abridgments; thirteen in German, the best being that of Braunfels (1884); ten in Russian, including abridgments and translations from the French, and three in Italian, besides single translations into Dutch, Danish, Polish, Portuguese, Swedish, Hungarian, Bohemian, Servian, and modern Greek. Besides the life of Cervantes by Navarrete, mentioned above, there is also a good one by Moran, attached to the *édition de l'œuvre* of *Don Quixote*, published in three quarto volumes at Madrid (1863). Of the collected works of C., an edition, not containing the comedies, appeared at Madrid (16 vols., 1803-5); and another, without the *Journey to Parnassus*, was published in the same city (11 vols., 1829). Don Aug. Garcia de Arrieta published a selection from the works of C. (10 vols., Paris, 1826-32); and a reprint of the collected works is included in Baudry's *Colección de los Mejores Autores Españoles* (Paris, 1840-41). England has been fertile in translations of C.'s immortal work. The first is that of Thomas Skelton (1612-20), in addition to which may be mentioned those of Philips, Motteux, Smollett, Duffey, Jarvis, Wilmot, and Clark. The best are those of Skelton, Jarvis, and Clark, and of Duffield (1881), Ormsby (1885), and Watts (1888-90). See Navarrete's *Vida de Miguel Cervantes Saavedra* (1819).

**CERVEIRA**, a t. of Spain, in the province of Barcelona, 28 m. e. of the city of Lerida. It is situated on an eminence, is surrounded by old walls pierced with nine gates, and the west approach is commanded by a castle, which is now in a ruinous condition. The university of Lerida was removed here by Philip V., but it was afterwards transferred to Barcelona. The university building, a massive but unsightly edifice, is still standing. C. has manufactures of linen, woolen, and cotton fabrics. Pop. 4200.

**CERVETERÉ**, or **CERVETRI**, is a village on the site of the ancient Cære, in a Etruria, near the Tyrrhenian sea, in the district of Civita Vecchia, 32 m. from Rome. It afforded refuge to the Tarquins after their expulsion from Rome, and was by the



Romans chosen as the safest hiding-place of their treasures during the occupation of the capital by the Gauls. The old city thenceforward declined, and in 1250 was deserted by a large portion of its inhabitants, who removed to the present village of Ceri. From the fact that the old inhabitants were admitted to Roman citizenship without the right of suffrage, the "Cærite franchise" came to be a proverbial expression denoting disfranchisement. Many interesting Etruscan remains have been found in the tombs of the city. One of the sepulchres belonged to the Tarquin family. See *illus.*, *ARCHITECTURE*, vol. I.

**CERVIA**, a t. of central Italy, situated on the Adriatic, 18 m. s.e. of Ravenna. It is regularly built, has a cathedral and several convents; and from a marsh in the neighborhood many tons of salt are annually obtained.

**CERVIDE** and **CERVUS**. See *DEER*.

**CERVIN**, MONT (Ger. *Matterhorn*; Ital. *Monte Sileio*), a mountain of the Pennine Alps, about 40 m. e.n.e. of Mont Blanc, and between the Valais in Switzerland and the Val d'Aosta in Piedmont. Above an unbroken glacier line of 11,000 ft. high, it rises in an inaccessible obelisk of rock, more than 8000 ft. higher, and is described by the late prof. Forbes as the most striking natural object he had ever seen. The total elevation of the mountain is 14,836 feet. The Col of Mont C., used as a passage for horses and mules in summer, has an elevation of 10,938 feet. See *MATTERHORN*.

**CERVINARA**, a t. of Italy, in the province of Avellino, 12 m. n.w. of Avellino. It has a convent and several churches, and a trade in the produce of the district. Pop. about 8000.

**CESARI**, GIUSEPPE (sometimes called GIUSEPPINO, or IL CAVALIERE D'ARFINO), an Italian painter, was b. at Rome, 1570, and d. there in 1640 (or 1642). He was greatly honored by no less than five popes, and his paintings were always highly popular. His works—in fresco and oil—display lively imagination, gay coloring, and great tact in execution; but are deficient in natural simplicity, correctness of design, symmetry of arrangement, and dignity of style. As he was the most brilliant of the mannerists, he was the chief object of the attacks made by the artistic reformers, Caravaggio, the Caracci, and their followers—who constituted the *naturalisti*—on the conventional or pseudo-idealistic style of painting.

**CESAROTTI**, MELCHIORE, an excellent Italian poet, was b. at Padua, 15th May, 1730, and d. 8d Nov., 1808. He gained a reputation by the vigor and originality of his style, especially in his translation of Macpherson's *Ossian* (2 vols., Padua, 1763). The versification of this work, like that of C.'s free translation of the *Iliad*, under the title of *La Morte di Ettore*, was admired by Alfieri. C. unquestionably threw fresh life into Italian literature, but few in this country will consider his enthusiasm very rational, when it could induce him to think poor Macpherson a better poet than Homer. C.'s best work was his *Saggio sulla Filosofia della Lingua* (Padua, 1785), written in opposition to the academical pedantry of La Crusca. His prose style is vigorous, but full of innovations, especially Gallicisms.

**CESAROVITCH**. See *CZAR*.

**CESENA**, a t. of central Italy, about 12 m. s.e. of Forlì, on the Emilian Way. It is pleasantly situated on a hill-slope, washed by the Savio. Its principal buildings are the *Palazzo Pubblico*, the Capuchin church, and the library founded by Domenico Malatesta Novello, in 1452, with a rich collection of MSS. There are many monasteries and nunneries, as befits a place that gave birth to two popes—Pius VI. and VII. It has some silk factories, with a trade in wine and silk; and in the vicinity are productive sulphur-mines. Pop. about 37,000.

**CESNOLA**, LUIGI PALMA DI, LL.D., Count, b. in Turin, Italy, 1832. When but 15 years old he enlisted in the war against Austria. In 1850, he graduated from the Turin Royal Military Academy, receiving a commission which he surrendered in 1854. In the Crimean war he was a staff officer. He emigrated to New York in 1860, and began teaching languages. The next year he married one of his pupils, a daughter of Commodore Reid, of the U. S. navy. In the war of the rebellion, he was col. of cavalry and participated in many engagements until June, 1863, when he was wounded and made prisoner. He was exchanged not long after, and left the service at the close of the war, with the rank of brig.gen.; at once became an American citizen, and was appointed consul at Cyprus. There he soon interested himself deeply in archaeological researches, and brought to light some of the most valuable remains of ancient Greek art thus far recovered (see *ARCHÆOLOGY*). In 1878 he gave lectures in New York and elsewhere, and in 1879 was made a director of the Metropolitan Museum of Art, in which his great collection is deposited. He published *Researches and Discoveries in Cyprus* (1878).

**CÉSPEDES**, CARLOS MANUEL DE, b. in Cuba, 1819; educated in the university at Havana, and admitted to the bar. He traveled in Europe and learned several languages. At Madrid he was concerned with Prim in a conspiracy to overthrow the government, and was compelled to fly. He returned to Cuba and began the practice of law. When Lopez made his revolutionary experiment, C. sympathized with the acts and was

imprisoned. When the revolt of 1868 began he was the leader, and one of his first acts was to liberate the slaves on his sugar estate. On the 10th of Oct., 1868, he proclaimed the independence of Cuba on the field of Yara, and when the republic was formally organized, April 10, 1869, he was elected president. The attempt at revolution was kept up at intervals until 1878. On the 21st of Feb., in that year, the rebellion was officially declared at an end. C. was killed by the Spaniards, 1874.

**CÉSPEDES**, PABLO DE, 1838-1908; a Spanish theologian, linguist, poet, painter, architect, and sculptor; b. at Cordova, and educated at Alcalá de Henares, and in art at Rome. He was a bold and correct draughtsman, a skillful anatomist, and a master of color and composition. His best picture is "The Last Supper," at Cordova. But little of his poetry has been preserved, the most important being fragments of *The Art of Painting*. C. held the office of prebend of the cathedral of Cordova.

**CESS**, probably a corruption for *asses*, from the Ital. *assessare*, to impose a tax. It has long been used in England as synonymous with the more modern noun *assessment*. Camden, in the time of Elizabeth, speaks of every man being "ceased by the pole, man by man, according to the valuation of their goods and lands." See **LAND-TAX**.

**CESS-POOL**. See **DRAINAGE**, **SEWAGE**, **SANITARY SCIENCE**.

**CESSIO BONORUM** (Lat. *cession* or *surrender of goods*), a process which the law of Scotland has borrowed from that of Rome, and which, like many others, is common to it with most of the continental systems. A C. B. may be defined to be an equitable relief from the severity of the earlier laws of imprisonment for debt, granted to a debtor in consideration of a cession of his goods to his creditors. The jurisdiction in cessios formerly belonged exclusively to the court of session, but by 6 and 7 Will. IV. c. 56, it was extended to sheriffs. The principal regulations, with reference to this process, at present in force, are the following: Any debtor in prison, or who has been in prison, or even against whom a warrant of imprisonment has been issued, may apply for a cessio bonorum. In his petition, he sets forth his inability to pay his debts, and his willingness to surrender his estates, and prays for interim protection. This petition must be intimated in the *Gazette*. The bankrupt then lodges with the sheriff-clerk a state of his affairs, subscribed by himself, with all the relative books and papers. On a day appointed for the purpose, he is examined before the sheriff on oath; and if his creditors object to the petition, they are heard, and a proof, if necessary, allowed them. Whatever order the sheriff may pronounce is subject to review by the court of session, or a lord ordinary in vacation. Cessios originating in the court of session are sued out in the form of a summons, by which all the creditors are called as defenders to the action. Any one or more of them may appear; and the pursuer will not be allowed the benefit of the process, till he has satisfied the court that his insolvency has arisen from misfortune, and that his disclosure of the state of his affairs is full and honest. The burden of proving objections to his statements, and to the evidence which he may produce, will be laid on the creditors. If the debtor can provide security to attend all diets when called on, the sheriff or the court of session may grant him liberation or protection whilst the process is pending. A decree of C. B. operates as an assignation of the debtor's movable estate in favor of a trustee for behoof of the creditors. These trustees, like those in sequestrations, are now placed under the supervision of the accountant in bankruptcy. A C. B. differs from a sequestration (q.v.) in this, that it confers no power on the bankrupt to insist on his discharge, and affords no protection against the attachment of his subsequent acquisitions by his creditors. See **INSOLVENCY**.

**CESTIUS**, **PYRAMID OF**, a Roman monument of the Augustan age, situated close to the Porto San Paolo, partly without and partly within the walls of Aurelian. It is known to every English traveler, being in the immediate vicinity of the cemetery where Protestants dying in Rome are buried. The exterior form is perfectly preserved; but of the paintings which formerly decorated the internal walls, only a few traces remain. Several copies of these paintings have been made, of which we may mention those edited by Falconieri, 1661. The pyramid is 125 ft. high, 100 ft. in width at the base; the walls 25 ft. thick. It is built of brick and tufa, faced with slabs of Carrara marble, now perfectly black with age, and rests on a base of travertine 8 ft. high. The interior contains burial chambers of considerable extent. The inner walls are covered with hard stucco, and the roof is vaulted. Both the walls and the roof were covered with paintings of female figures. The memory of the Caius Cestius for whom this pyramid was built has perished, but it has been supposed that he was the Cestius whom Cicero—in the oration *pro Placco*—mentions as a rich man of business, who, having no children, left a large sum of money for the erection of a monument to himself. Two fluted columns of white marble, now standing before the pyramid of C., with their bases and two other bases, were discovered in the excavations of 1663, at the foot of the pyramid. In the cemetery, the remains of several celebrated men have their resting-place, among whom are the poets Keats and Shelley, Wyatt the sculptor, and Bell the anatomist.

**CESTOID WORMS** (Lat. *cestus*, a band or throng), a family of *entozoa*, or intestinal worms, of the order *Cestodimorphia*, consisting of tape-worms and other creatures which resemble them in structure and habits. The number of different kinds of C. W.

is great. Their natural history is important in reference to the health of human beings and of the most valuable domesticated animals; and although the subject is not in all respects an agreeable one, it presents much that is interesting and wonderful. Recent discoveries have given it an entirely new character.

C. W., in their most perfect state, when alone they possess the form from which their name is derived, are in reality compound animals, like many zoophytes and ascidians. They do not, however, like these, subsist by food entering the system through mouths with which the individuals composing it are furnished; for the joints of a cestoid worm, the individuals composing the system or "colony," have no mouth; nor is there any mouth in what is, on various accounts, quite properly regarded as the head, but nutriment is obtained from the surrounding medium by *endosmose* (q. v.); nourishing juices entering everywhere through the skin, as in the spongioles of the roots of plants, into the cellular tissue or *parenchyma* of which the whole body consists. The head of a cestoid worm is furnished with organs—different in different kinds—by which it affixes itself to the inner surface of the intestine of a vertebrate animal. When first it gets into this situation, the body is very short, and has no joints; but they soon begin to appear as transverse striae, and gradually increasing in size, become in most of the kinds very distinct, and at last separate from the system in which they were produced, and are carried away out of the intestines of the animal which contained them. This does not take place, however, till they have not only become mature in the development of the sexual organs—the principal organs to be observed in them—but until they are full of what are called eggs, which, indeed, are rather young ones ready for a separate existence, and each enveloped in a sort of protective shell. Each joint of a cestoid worm is androgynous. Whilst the most matured joints are thrown off from the posterior end, new joints are continually formed, as at first, in the part nearest to the head. The number of joints thus formed from a single individual is very great, as will appear when it is considered that tape worms have been found 20 feet long or upwards, and that these have probably been throwing off joints in large numbers before opportunity has been obtained of measuring them.

As the C. W. have no mouth, so they have no alimentary canal. Some of them, as the true tape-worms, have been supposed to imbibe nourishment by the sucking disks of the head; but these are more probably mere organs of attachment, and the canals which are seen to arise behind them, apparently belong, not to the digestive, but to the vascular system, and are united by transverse vessels or vascular rings in the head and in each of the segments. The only trace of a nervous system hitherto observed is a single ganglion in the head, which in some is seen to send off nerves to the suckers.

The division into segments remains imperfect in some cestoid worms. Those of the genus *ligula*—chiefly found in birds and fishes—resemble a long flat ribbon, not even notched along the edge, and containing a mere series of hermaphrodite brood-places. When segmentation is perfect, the segments (*proglottides*), on separating from the parent system (*strobila*), possess life and a little power of independent motion, creeping away on moist ground, plants, etc. Their period of separate existence, however, is brief; they burst or decay, and the numerous minute embryos which they contain are ready to commence their career, if in any way transferred into the stomach of an animal of proper kind, which is generally different from that whose intestine their parent inhabited. This may happen by their being swallowed—or even the *proglottis* itself—along with water, grass, etc. Some of the C. W. in this embryo state find their appropriate place in the stomachs of vertebrate, and others in those of invertebrate animals.

The shell being broken or digested, the young cestoid worm is set free. It is extremely unlike the *proglottis* by which it was generated. It presents the appearance of a vesicle furnished with a few microscopic hooks. It possesses, however, a power of active migration by means of these hooks, and is able to perforate the stomach of the animal which contains it. To this its instinct seems immediately to prompt it, and it is so minute that it passes through the stomach without any serious inconvenience to the animal. It now probably gets into the blood, and is lodged in some of the capillaries, from which it makes its way again by perforation, until it finds a suitable place in some of the tissues or of the serous cavities, in the flesh, or in such organs as the liver or the brain; and here relinquishing all active migration, it rapidly increases in size, at the same time developing a head, which is in fact that of a cestoid worm, and generally either encysts itself or is encysted—inclosed in a cyst (q. v.)—according to circumstances, or according to its species. Great numbers of such parasites are sometimes present in a single animal, causing disease and even death. Until recently, they were regarded by naturalists as constituting species and genera quite distinct from the C. W., of which they are really the young; and the name *scolex*, formerly given to one of these supposed genera, has now become a common name for the young of all C. W. in this stage, as *larva* is the common name for the young of insects in their first stage after being hatched from the egg. Those scolices which inhabit vertebrate animals very generally become distended with a watery fluid, and in this state were formerly regarded as *hydatids* (q. v.); little else, indeed, appearing without very careful examination, but a small bag filled with fluid, the *scolex* head being formed within the bag, although capable of being everted from it, as the finger of a glove which has been drawn in at the end is turned out. Such is the young of the common tape-worm (*tenia solium*), formerly known to

naturalists as *cysticercus cellulosa*, and found in the flesh of the pig and of some other animals, and sometimes of man. It is this scolex, existing in great numbers, which produces in the pig the diseased state commonly known as *measly*; and it is very unsafe even to handle measly pork in a raw state, because a scolex accidentally getting into the mouth, and thence into the stomach, is likely to become a formidable inmate of the intestinal canal. It does not appear that this particular species has the power of multiplying in its scolex state, or the circumstances in which it exists in the flesh of the pig may be unfavorable to its so doing, and the prodigious numbers sometimes existing in a single animal have probably all entered by the mouth in the way already described, the contents of a single proglottis or joint of a tape-worm being perhaps sufficient to account for them; but some scolices, as that called *cœnurus cerebralis*, found in the brain of sheep, and the cause of the disease called *staggers*—now known to be the scolex of a *tanis* of the dog—are proliferous by a sort of pullulation, so that clusters of scolices cover the same parental vesicle. Until, however, the scolex reaches the intestine of an animal suited to it, its propagation is entirely unsexual, and no organs of sex exist; but no sooner is it there, than it begins to develop itself into a cestoid worm, and to produce androgynous joints, fertile of new embryos, as already described. Thus we have in these creatures an instance, in its relations the most important known, of the recently discovered alternation of generations. See GENERATIONS, ALTERNATION OF. The transference of the scolex from its place of growth to that in which it becomes a cestoid worm, usually if not always takes place by the animal which contains it being eaten by that whose intestine is suitable to its perfect development. Each kind of cestoid worm is limited to certain kinds of vertebrate animals, and it has been proved by experiment that if introduced into the stomach of other kinds, the scolices soon die. The only C. W. which infest the human species are *bothriocephalus* (q.v.) *latus*, and tape-worms (q.v.). See Von Siebold's interesting work on tape and cystic worms, printed for the Sydenham Society (London, 1857).

**CESTRACION**, a genus of sharks, regarded as constituting a distinct family, *cestraciontida*, although not more than two species are known as now existing. It is characterized by having two dorsal fins and one anal, the first dorsal situated over the space between the pectorals and ventrals; a spine forming the front of each dorsal; a short, wide tail, with its upper lobe strongly notched beneath; the mouth at the fore-end of the snout; spout-holes distinctly visible, rather behind the eyes; eyes destitute of nictitating membrane; small gill-openings; and the front of the mouth armed with sharp angular teeth, whilst the margins and inner surface of the jaws are covered with pavement-like teeth, presenting a general continuity of surface, as in skates, and disposed in rounded oblique scrolls—the former evidently adapted to the seizing of food, the latter to the crushing and bruising of it. The Port Jackson shark or “nurse” (*C. Philippi*) of the Australian seas, and the cat shark of Japan and China (*C. zebra*), seems to differ chiefly in the patterns of color. The *cestraciontida* are particularly interesting to geologists; for the oldest fossil sharks belong in great part to this family, of which “remains are found even in the paleozoic strata; they become more numerous in the carboniferous series; they are very numerous in the lias and chalk formations.

**CESTRUM**, the style or spatula used by the ancients in encaustic painting in wax and ivory. See ENCAUSTIC PAINTING.

**CESTUI QUE TRUST**, a person who possesses the equitable right to deal with property, the legal estate in which is vested in a trustee. There is such a confidence between the cestui que trust and his trustee, that no action at law will lie between them, but they must settle their differences and arrange their disputes in a court of equity. “The phrase *cestui que trust* is a barbarous Norman law French phrase, and is so ungainly and ill adapted to the English idiom, that it is surprising that the good sense of the English legal profession has not long banished it, and substituted some phrase in the English idiom, furnishing an analogous meaning.”—Wharton's *Law Lexicon*.

**CESTUI QUE USE**, in feudal law, designates a person to whose use another holds the fee of lands or tenements. The phrase has no proper application to the modern American bar, though sometimes applied to one for whom a use exists under a will.

**CESTUI QUE VIE**, a person whose life is the measure of the duration of an estate. If A. grants to B. an estate to be B.'s own so long as another person named C. lives, then C. is the *cestui que vie*.

**CESTUS** (Gr. *kestos*, embroidered), a girdle worn by Greek and Roman women close under the breasts, and so distinguished from the *zona*, worn round the loins. The C. of Venus was covered with alluring representations, so that Juno borrowed it when she desired to win the love of Jupiter.—**CESTRUS**—or, more correctly, **CÆSTRUS**, from the Lat. *cædere*, to slay—is also the name of the covering for the hands worn by Roman pugilists. It was at first nothing more than a leathern thong or bandage to strengthen the fist; but afterwards it was covered with knots and nails, and loaded with lead and iron, etc., to increase the force of the blow. It was not uncommon for a pugilist armed with the C. to dash out the brains or break the limbs of his antagonist. The Roman pugilist (*castrarius*) was often represented in sculpture.

**CETACEA** (Gr. *ketos*, a whale), an order of mammalia (q.v.) greatly differing in general form and habits from the rest of that class, so as indeed to be popularly reckoned among fishes. The C. have a fish-like form, terminating in a fish-like tail or tail-fin, which, however, is not vertical, as in fishes, but horizontal, and is the great instrument of progression; being moved by very powerful muscles, commonly with an oblique downward and lateral movement, like that by which a boat is propelled in sculling, but sometimes by direct upward and downward strokes, when greater velocity is requisite. There are no hinder limbs, and even the pelvis is represented only by two small rudimentary bones, suspended in the soft parts, so that the body tapers gradually and uninterruptedly towards the tail. The fore-limbs are exclusively, or almost exclusively, adapted for swimming; their bones, however, appearing in the skeleton as those of a hand, placed at the extremity of an arm, of which the bones are much abbreviated and consolidated, with little power of motion except at the shoulder-joint, and are entirely concealed in the soft parts of the animal. The head is connected with the body without any apparent neck, and the vertebrae of the neck are partly ankylosed or soldered together. The skin is naked, having no general covering of hair, although some of the species possess conspicuous whiskers. The C. agree with quadrupeds, notwithstanding the great differences already indicated, in the most important parts of their organization. They are viviparous, and suckle their young, for which they exhibit great affection; they are also warm-blooded, breathe by lungs, and not by gills, and come to the surface of the water for the purpose of inhaling air. An approach to their fish-like form is to be seen in seals (q.v.) and other *phocids*; in which, however, the hinder limbs are largely, although peculiarly developed, whilst the fish-like tail-fin is wanting; the skin has a covering of hair; and the head and fore-limbs more resemble those of ordinary quadrupeds.

The C. are usually divided into two sections—the *herbivorous* and the *ordinary* C.; but the former, constituting the family of *manatids* (q.v.), have recently, by some systematic naturalists, been rejected from this order altogether, and associated with the *pachydermata*. They differ very widely from the ordinary or true C., not only in their adaptation for the use of vegetable instead of animal food, which appears both in their dentition and in their digestive apparatus, but also in their pectoral instead of abdominal teats, and in their want of *blow-holes* and of any provision for retiring to great depths of the ocean, and remaining there for a considerable time, without returning to the surface to breathe.

The ordinary or true C. are divided into the families of *delphinids* (dolphin, porpoise, beluga, bottlenose, narwhal, etc.), *physterids* or *catodontids* (cacholot, or spermoceti, whale, etc.), and *balanids* (Greenland whale, rorqual, etc.), the distinguishing characters of which are given under separate heads. They all feed on animal food, some of them pursuing and devouring fishes; others, and these the largest, subsisting chiefly on smaller prey, mollusks, small crustaceans, and even zoophytes, which they strain out of the water by a peculiar apparatus in their mouths. None of the true C. have molar teeth or grinders like the *manatids*; all the teeth which any of them have are conical; but some of the largest are entirely destitute of teeth. The females of all of them have the teats situated far back on the abdomen. The fore-limbs of the true C. are mere fins, the slight power of grasping with them, which the *manatids* possess, having entirely disappeared. The resemblance to fishes is increased in many of them by the presence of a dorsal fin. There is a wonderful provision to enable them to spend some time under water, before returning again to the surface to breathe—an arterial plexus or prodigious intertwining of branches of arteries, under the pleura and between the ribs, on each side of the spine. This being filled with oxygenated blood, after the animal has spent some time at the surface breathing, the wants of the system are supplied from it, whilst breathing is suspended, so that some whales can remain below even for an hour. The position of the nostrils is remarkable, almost on the very top of the head, so that the animal can breathe as soon as the head comes to the surface of the water; and the nostrils are furnished with a valve of singular but very perfect construction, a sort of conical stopper of fibrous substance, preventing the ingress of water even under the pressure of the greatest depths. The nostrils appear to be little used for the purpose of smelling, the sense of smell being one which these animals either do not possess at all, or in a very imperfect degree; but they are much used, not only for breathing, but also for *spouting*, or the ejection of water from the mouth, for which reason they are generally called *blow-holes*—the water being forced through them by the compression of two large pouches or reservoirs which are situated beneath them. This compression is accomplished by an action similar to that of swallowing; the throat, however, not being open, but closed. The height to which the water is thrown into the air is extraordinary, and the spouting of the whale is one of those wonders of the ocean never to be forgotten by those who have seen it.

A peculiarity in the skin of the true C. adapts them for their manner of life. The skin is extremely thick, the inner part of it consisting of elastic fibers interlacing each other in every direction, the interstices of which are filled with oil, forming the substance usually called *blubber*. The oil deposited in this unusual situation, not only serves the ordinary purposes of fat, but that also of keeping the body warm, which to a warm-blooded animal, continually surrounded with water, is of great importance;

whilst the elasticity of this extraordinary skin affords protection in the great depths to which some of the whales descend, and in which the pressure must sometimes amount to a ton on every square inch.

The number of known species of *C.* is not great, but their natural history has as yet been very imperfectly studied. All of them are large animals, some of them by far the largest that now exist. Almost all of them—both herbivorous and ordinary—are marine, but some of the smaller species ascend large rivers to a great distance from the sea; and one, of the family *delphinidae*, belongs exclusively to fresh waters, being found only in the upper tributaries of the Amazon and the elevated lakes of Peru.

*Fossil cetacea* have been hitherto discovered only in the tertiary formation. Their remains represent species not only belonging to each of the recent families of true *C.*, but have supplied materials for forming a new family intermediate between the true whales and the herbivorous cetacea. These fossils were originally described as reptiles; but they have been satisfactorily shown to be carnivorous *C.* by Owen, who, from their remarkable conjugate teeth, has given the typical genus the name of *zeuglodon* (q.v.), and the family that of *zeuglodontidae*. In all, six or seven species have been described belonging to this family, from the eocene and miocene beds of Europe and America. The *delphinidae* appears first in the miocene strata, and continue through the newer beds. The remains of a narwhal, which cannot be distinguished from the living species, have been found in several places in England. Of *physeteridae*, three species have been noticed in pleiocene and pleistocene strata, belonging to the recent genus *physeter*. Fossil *balenidae* occur in the miocene and newer beds. Only four species have been described, if we exclude *cetotolithes* (q.v.), a name given to teeth and ear-bones, belonging to animals of this family, which occur in great numbers in the Suffolk Crag.

**CETEWAYO.** See ZULULAND

**CETOTOLITES**, a name given by Owen to fossil cetacean teeth and ear-bones, which occur in great abundance in the Red Crag of Suffolk, a member of the pleiocene period. They are rubbed and water-worn, and have evidently been washed out of some earlier strata, which remain yet unrecognized. The extent of these earlier strata must have been very great, seeing that the remains now extend over a large district in Essex and Suffolk, and attain a thickness, in some places, of not less than 40 ft. Prof. Henslow, in 1843, drew the attention of agricultural chemists to this deposit, as a source of materials for manure, and since then superphosphate manures have been manufactured from it to the value of many thousand pounds annually; a striking example of the valuable practical results which frequently flow from a purely scientific discovery.

**CETRA'RO**, a t. of s. Italy, in the province of Cosenza, situated on the Mediterranean, 24 m. n.w. of Cosenza. It has anchovy fisheries, and a population of about 7000.

**CETTE**, a seaport t. of France, in the department of Hérault, is built on a neck of land between the lagoon of Thau and the Mediterranean, in lat. 43° 24' n., long. 3° 42' east. The town, which is entered by a causeway raised above the Thau lagoon, and a bridge of 53 arches, is fortified, and the harbor is defended by a citadel and forts. The space inclosed by the piers and breakwater forming the harbor is about 30 acres, and has a depth of from 16 to 19 feet. A broad deep canal, lined with excellent quays, connects the port with the lake of Thau, and so with the Canal du Midi and the Rhone, thus giving to *C.* an extensive inland traffic; it has likewise an active foreign commerce. The principal trade is in wine, brandy, salt, dyestuffs, perfumery, and verdigris. *C.* has ship-building yards, and fisheries of oysters and anchovies. Pop. '98, 32,729.

**CETTIGNÉ, or CETINJÉ.** See MONTENEGRO.

**CETUS, or THE WHALE**, the largest of all the constellations. It reaches from 0° to 25° s. declination, and from 0 to 2h. 30m. right ascension. *Mira*, a variable star, is the most conspicuous feature.

**CEUTA**, a t. belonging to Spain, situated in the kingdom of Fez, on the n. coast of Africa, and opposite to Gibraltar, in lat. 35° 54' n., and long. 5° 16' west. It is strongly fortified, and defended by a citadel and forts erected on mount Hacho, the ancient *Abyla*, or south pillar of Hercules. It is the most important of the four Spanish *presidios*, or convict establishments, on this coast. The harbor is small and not very safe; and the population, which is about 10,700, is composed of Spaniards, Moors, Negroes, Mulattoes, and Jews, mostly very poor, and employed in trade and fisheries. Many of the Spaniards living here are state-prisoners, and even the garrison is partly manned by convicts. *C.*, formerly called *Septa* or *Septum*, was taken from the Vandals in 534 by Justinian, who fortified the place anew. In 618, it fell into the hands of the western Goths; afterwards it was taken by the Moors, who held it until 1415, when it was captured by the Portuguese. It was annexed, with Portugal, to the crown of Spain in 1580, and was the only place on the African coast retained by Spain when Portugal was restored to its independence in 1640.

**CEVADIL'LA.** See SABADILLA.

**CEVENNES** (ancient *Cebenna*), the chief mountain range in the s. of France. With its continuations and offsets, it forms the water-shed between the river systems of the Rhone and the Garonne. Its general direction is from n.e. to s.w., commencing at the southern extremity of the Lyonnais mountains, and extending under different

local names as far as the Canal du Midi, which divides it from the northern slopes of the Pyrenees. The central mass of the C. lies in the departments Lozère and Ardèche, Mont Lozère reaching an elevation of 4,884 ft., and Mont Mézen (the culminating point of the chain) an elevation of 5,794 feet. The average height is from 3000 to 4000 feet. The masses consist chiefly of amphibolite rocks, graywacke, and limestone, covered with tertiary formations, which in many places are interrupted by volcanic rocks.

The C. has been celebrated as the arena of religious warfare. As early as the 12th c., the several sects known by the names, the "Poor of Lyons," the *Albigenses* (q.v.), and the *Waldenses* (q.v.), were known and persecuted in this district. After the revocation of the edict of Nantes by Louis XIV. in 1685, a series of cruel persecutions of the Protestants in the C. began, especially in 1697, after the peace of Ryswick. "Dragonades" (q.v.) were employed to enforce the doctrines of the monks sent as missionaries into the heretical district. All persons suspected of Protestantism met with the most harsh and cruel treatment. Some of the inhabitants emigrated, others fled into the fastnesses of the mountains. Driven to desperation, the persecuted people at length rose to arms, and the murder of the abbé du Chaila, who was at the head of the dragonades, gave the signal of a general insurrection in 1702. The insurgent peasants were styled *Camisards* (q.v.) perhaps from *camise*, a smock worn by the peasantry. Headed by bold leaders, the most famous of whom were Cavalier and Roland, they defeated the troops sent against them by Louis again and again, until that king thought the insurrection of sufficient importance to require the presence of the distinguished general, marshal Villars; but he was recalled before the revolt had been put down, and it was left to the duke of Berwick to extinguish it in blood; the contest terminating in an entire desolation of the province, and the destruction or banishment of a great portion of the inhabitants. The embers of religious hatred still remained glimmering through the following century, and, after the restoration of the Bourbons in 1815, burst out into flames in the terrible persecution of the Protestants in Nîmes (q.v.) and other places in the s. of France. See *Histoire des Troubles des Cévennes* by Court de Gébelin (1760); Schulz's *Geschichte der Camisarden* (1790); Bray's *Revolt of the Protestants of the C.* (1870).

#### GEYLANITE. See SPINEL.

**GEYLOW'** (the *Taprobans* of the Greeks and Romans, and the *Serendib* of the *Arabian Nights*), a valuable island and British colony in the Indian ocean, to the s.e. of the peninsula of Hindustan, from which it is separated by the gulf of Manaar and Palk's strait. Recent observations have shown its true place to be between 5° 55' and 9° 51' n. lat., and 79° 42' and 81° 55' e. long. Extreme length from n. to s., from Point Palmyre to Dondera Head, 271½ m.; greatest width, from Colombo to Sangemankande, 187½ miles. Area, including dependent islands, 25,365 sq. miles.

**Physical Features.**—In natural scenery, C. can vie with any part of the world; and as it rises from the ocean, clothed with the rich luxuriance of a tropical vegetation, it seems to the voyager like some enchanted island of eastern story. Its hills, "draped with forests of perennial green," tower grandly from height to height, till they are lost in clouds and mist. Near at hand, a sea of sapphire blue dashes against the battlemented rocks that occur at isolated points, and the yellow strands are shaded by groves of noble palms. In shape, C. resembles a pear, but its inhabitants more poetically compare it to one of their elongated pearls. Undulating plains cover about four parts of the island, and the fifth is occupied by the mountain-zone of the central s., which has an elevation of from 6,000 to 8,000 ft. above the sea-level. Pedrotallagalla, the highest mountain in the range, attains the height of 8,280 ft.; the celebrated mountain of Adam's peak, 7,420 ft.; and the table-land of Neuera Ellia, 6,210 feet.

**Geology.**—The mountain system is mainly composed of metamorphic rocks, chiefly gneiss, frequently broken up by intruded granite. With the exception of some local beds of dolomitic limestone, the gneiss is everywhere the surface rock, and the soil is composed of its disintegrated materials. No fossils, as was to be expected, have been noticed in C., if we except the semi-fossil remains of mollusca, crustacea, and corals, belonging to living species, which occur in the rude breccias of the n. in the neighborhood of the sea. The northern part of the island is rising, and there also the land is making encroachments on the sea from another agency. The immense masses of corals continually increasing, retain the debris brought from the Indian continent by the currents of the sea, and thus form a flat, ever-increasing madreporé plain.

**Of metals and minerals,** iron, in the form of a carbonate, can be obtained in great quantities, and of such purity as to resemble silver. Tin is found in the alluvium at the base of the mountains, and on the heights the rare metal tellurium has been discovered. Nickel and cobalt are scarce. Anthracite and rich veins of plumbago exist on the southern range of hills. The *gems* of C. have been celebrated from time immemorial, and they are most plentiful in the alluvial plains at the foot of the hills of Saffragam. Sapphires, rubies, the oriental topaz, garnets, amethysts, cinnamon stone, and cat's-eye, are the principal gems and precious stones of the island. The most valuable is the sapphire; and one of these, found in the year 1853, was worth more than £4,000. The pearl fisheries of C. have long been famous, and since the beginning of the century are conducted directly for behoof of the government. But sometimes fishing operations

have to be suspended for a considerable period; thus there was no fishery from 1883 until 1874. In 1887, pearls worth \$195,000 were secured; and in 1891, 980,000 rupees, but during the four succeeding years the industry was unproductive.

**Rivers.**—The most important river in C. is the Mahawelli-ganga. It has its source in the vicinity of Adam's peak, and after draining more than 4,000 sq. m., it separates into several branches, and enters the ocean near Trincomalee. The s. side of the island is watered by 10 rivers of considerable size, which flow into the sea between Point de Galle and Manaar. On the e. coast, the rivers are smaller, but still more numerous, and many others traverse the northern and eastern provinces.

**Harbors.**—Point de Galle (q. v.) and Trincomalee (q. v.) are the two harbors of Ceylon. The former is small and dangerous, but the latter is unsurpassed as a safe and commodious port. The variation of the tides is very trifling; the rise and fall not generally exceeding 18 to 24 in., with a third of increase at spring-tides.

In *climate*, C. has a great advantage over the mainland of India, and as an island, enjoys a more equable temperature. The average for the year in Colombo (q. v.) is 80° in ordinary seasons. April is the hottest month; and in May the s.w. monsoon commences amid a deluge of rain, and continues the prevailing wind till Oct., when the n.e. monsoon sets in: 80 in. is the average annual fall of rain, though in an exceptional year, 120 in. have been registered. The beautiful table-land of Neuera Ellia was first visited by Europeans in 1826, and is now used as a sanatorium. Here the thermometer in the shade never rises above 70°, while the average is 62°; the nights are cool and refreshing. The n. of the island, including the peninsula of Jaffna, the plains of Neuera Kalawa, and the Wanny, may be reckoned as a third climatic division. Here the annual fall of rain does not exceed 80 in., and irrigation is largely employed in agriculture.

**Flora.**—The general botanical features of C., especially of the lowlands, are nearly identical with those of southern India and the Deccan, although it possesses a few genera of plants not to be found in those regions. Its phenogamic plants are limited to about 8,000. The beautiful ixoras, erythras, buteas, Jonesias, and other flowering shrubs bloom in the forests. At an elevation of 6,500 ft., the acanthaceae cover large tracts of ground, and the tree-fern reaches the height of 20 feet. On the highest ground, rhododendron attain the size of timber-trees. The coral-tree (*eurythrina indica*), the murutu (*lagerstromia regina*), and the *Jonesia asoca* are amongst the most magnificent of the flowering trees. The fig tribe are planted in the vicinity of the temples. In the forests, climbing-plants and epiphytes of prodigious size and striking appearance cover the trees with a mass of parasitical foliage of extraordinary growth. The palmaceae are very conspicuous in the vegetation of C., although not more than 10 or 12 species are indigenous: the cocoa-palm—of which it is estimated there are not less than 20 millions of trees—the talipot, the palmyra—which forms extensive forests in the n. of the island—and the jaggary palm are the most noteworthy. Of timber-trees, 416 varieties are known, and amongst these the satin-wood holds the first rank. The flora of the highlands, above 2,000 ft., and up to 6,000 or 7,000, though much resembling that of the Neilgherries, has a marked affinity to the vegetation of the highlands of Malacca and Java, especially the latter.

**Fauna.**—A knowledge of the fauna of C. has been greatly advanced by the labors of Drs. Templeton and Kelaart and Mr. Edgar Layard. *Quadrumanous* animals are represented by the *loris gracilis*, and five species of monkeys. Sixteen species of the *cheiroptera* or bat tribe, exist in C., and what is very remarkable, many of these rival the birds in the brilliancy of their colors. The *pteropus edwardsii* (the flying-fox of Europeans) measures from 4 to 5 ft. from tip to tip of its extended wings. Of the larger *carnivora*, the bear and the leopard, and of the smaller, the palm-cat and the glossy genet (the civet of Europeans) may be mentioned. The dreaded tiger of India, the cheeta, the wolf, and the hyena are happily not met with in Ceylon. Deer, buffaloes, and the humped ox of India are amongst the *ruminantia*; the little musk-deer (*moschus meminna*) is less than 2 ft. in length. The *pachydermata* are represented by the elephant and the wild boar; the former, which is for the most part tuskless, is emphatically lord of the forests of Ceylon. The most remarkable of the *cetacea* is the dugong. Whales are captured off the coast; 820 species of *birds* have been ascertained by Drs. Templeton and Kelaart and Mr. Layard. The song of the robin and long-tailed thrush, and the flute-like voice of the oriole, are heard over the whole mountain zone, and far down into the neighboring plains. Eagles, the beautiful peregrine falcon, owls, swallows, kingfishers, sun-birds, bulbuls, crows, paroquets, pigeons, pea-fowl, jungle-fowl, and many others of the feathered tribe might be mentioned did space permit. Myriads of aquatic birds and waders, amongst which the flamingo is conspicuous, cover the lakes and lagoons. The crocodile is the largest reptile in the island; tortoises and lizards are also found. There are a few species of venomous snakes, and of these the ticpolonga and the cobra da capello are the most deadly.

**Inhabitants.**—The Singhalese, the most numerous of the natives of C., are the descendants of those colonists from the valley of the Ganges who first settled on the island 548 B.C. In their customs, costume, and general appearance, they have remained unchanged since the days of Ptolemy. The dress of the men, who have delicate features and slender limbs, is singularly effeminate, and consists of a *comboy* or waist-cloth, very much resembling a petticoat; their long hair, turned back from the forehead, is confined with combs, and ear-rings are worn by way of ornament. The women,



in addition to the comboy, cover the upper part of the figure with a white muslin jacket, and adorn themselves with necklaces, bangles, rings, and jewelry. The Singhalese are false and cowardly, but manifest a strong affection for their relatives, and a reverence for old age. Polyandry still lingers in the interior of C., and was formerly universal; it is now, however, chiefly confined to the wealthier classes, amongst whom one woman has often three or four husbands. The Kandians, or Highlanders, are a more sturdy race, and maintained their independence for three centuries after the conquest of the low country by European settlers. The Malabars, or Tamils, have sprung from those early invaders of C., who from time to time swept across from southern Hindustan, and contended with the Singhalese kings for the sovereignty of the island. They have formed the chief population of Jaffna for full 2,000 years, and constitutionally excel the Singhalese and Kandians. The Moormen, who are the most energetic and intelligent of the native communities, are met with in every province as enterprising traders. They are a very distinct race from the Singhalese, but have no tradition of their origin. Europeans generally believe them to be of Arab descent, but Tennent is of opinion that "they may be a remnant of the Persians, by whom the island was frequented in the 4th and 5th centuries.

The "burghers" of C. are a people of European descent, who have become naturalized. Those of Portuguese extraction hold the lowest place, and are mostly tradesmen and artisans; but the Dutch burghers frequently fill responsible posts, and are employed in the government offices.

Besides the races already alluded to, there is a remarkable tribe of outcasts—the Veddahs—hardly removed from the wild animals of the forest, and believed to be descended from the Yakkhos, the aboriginal inhabitants of the country. They occupy a district in the eastern part of the island, and have there preserved their ancient customs and manner of living unaltered for more than 2,000 years. They appear to be without the instinct of worship, and have no knowledge of a God. The tribe is divided into the *Rock Veddahs* and the *Village Veddahs*. The former hide themselves in the jungle, live by the chase, and sleep in trees or caves. They use fire to cook their meat, and their greatest gastronomic treats are the iguana lizard and roasted monkey. Their language—if the few words they make use of can be called by that name—is a dialect of the Singhalese. The Village Veddahs locate themselves in the vicinity of the European settlements, on the eastern coast, living in rude huts of mud and bark, and are hardly more civilized than their brethren of the jungles. The exertions of government to reclaim this harmless but degraded people have in some degree succeeded, and a promising colony has been formed.

*Population.*—Sir J. E. Tennent is of opinion that C., when in the height of its prosperity, must have been ten times as densely peopled as at the present day. In the official returns for the year 1891, the area and population of the provinces of Ceylon are given as follows:

PROVINCES.	Area; Sq. Miles.	Population, 1891.		PROVINCES.	Area; Sq. Miles.	Population, 1891.	
		Total.	Per Sq. m.			Total.	Per Sq. m.
Western .....	1,351.5	763,187	565	North-Western .....	3,024.5	320,032	41
Central .....	2,323.7	474,487	205	North Central .....	4,046.7	75,319	19
Northern .....	3,171.0	319,193	101	Uva .....	3,725.0	159,155	43
Southern .....	1,980.0	489,761	247	Sabaragamuwa .....	2,085.0	258,605	102
Eastern .....	3,657.5	148,727	41	Total .....	25,364.9	3,008,466	118

According to the census of 1891, it was estimated that the inhabitants of Ceylon numbered 3,008,466 souls, of whom 2,041,158 are native Singhalese, 21,231 Eurasian descendants of Europeans, and 6068 English, with 723,853 Tamil immigrants and settlers, and 216,156 Moormen, Malays, Veddahs, and other races.

*Religion.*—The Singhalese are devoted to Buddhism (q.v.), which is the prevailing religion of the island. It does not exist, however, in that state of purity in which it is still found in the Indo-Chinese peninsula. Its sacred books are identical with those of Burmah and Siam, and both record the doctrines of Gautama in the Pali language; the deviations are in matters of practice. The Malabar kings adulterated Buddhism to a considerable extent with Brahmanism, introducing the worship of Hindu deities into the Buddhist temples, and this continues more or less to be the case. More than once have the Buddhists of C. sought to restore the purity of their faith—at one time sending deputies to Siam, at another to Burmah, with this object in view. The Burmah or Amarapura sect have long been the reformers of Singhalese Buddhism, and maintain no very friendly relations with the party, who, supported by the priests of Siam, acknowledge the civil power in matters of religion, sanction the worship of Hindu deities and the employment of the priesthood in secular occupations, uphold caste, and restrict the

sacred books. Caste was acknowledged by the Singhalese prior to the introduction of Buddhism, which in principle is opposed to it; but so firmly was it rooted, that it still endures, though more as a social than a sacred institution. Gautama Buddha is said to have visited C. three different times to preach his doctrine, and his *Sri-pada*, or sacred footstep, on the summit of Adam's Peak (q.v.), still commands the homage of the faithful. Buddhism was not, however, permanently introduced into C. till 807 a.c., when Mahindo, obtaining the support of the king, established it as the national faith. The influence of the priests gradually increased, and, by the piety of the Singhalese kings, monasteries were richly endowed; for though the Buddhist monk is individually forbidden to possess goods, a community may own property to any extent; and it is a remarkable fact that, at the present day, no less than one third of the cultivated land of the island is computed to belong to the priesthood, and is exempt from taxation. The priests of C. are divided into two orders—the *Samanaros*, and those who, after a time of probation, receive the higher grade of *Upasampada*. The fraternity are not raised by education above their countrymen, and the respect paid them is directed more to the dress than to the person of the individual. Any member is at liberty to lay aside his ascetic character, and return to a secular life. The most celebrated Buddhistic relic in C. is the *Dalada*, or sacred tooth of Gautama, at Kandy, which is guarded with jealous care, and preserved in an elegant shrine; but it is well known that the original relic was destroyed by the Portuguese, and the present substitute is a piece of discolored ivory, bearing no resemblance to a human tooth. In all Buddhist countries, the sacred buildings present, with certain modifications, the same general character (see articles **Buddhism**, **BURMAH**, etc.); and in C. we find the three classes represented by the dagoba, or relic-shrine (*dattu*, a relic, and *gabbhan*, a shrine), the temple proper, and the vihara or monastery. The labor bestowed on these edifices in the early ages of the Singhalese monarchy is truly astonishing. In the n. of the island, ruined cities—buried for ages in the depths of the forest—have been discovered, revealing monuments that in dimensions may almost compare with the pyramids of Egypt. The most remarkable of these vestiges of an early civilization is Pollanarura, the ancient capital of C.; and here is the celebrated *Gal-vihara*, a rock-hewn temple, supposed to be “the only example in Ceylon of an attempt to fashion an architectural design out of the rock, after the manner of the cave-temples of Ajunta and Ellora.” The reclining figure of Gautama is 45 ft. in length, the upright one measures 28 ft.; and the sitting image on the left is 16 ft. from the altar to the top of the head. The cave-temple of Dambool was built 100 a.c., and is the most celebrated in the island. The bell-shaped tapering dagobas of C., as relic-shrines, answer to the pagodas of Burmah—which they very much resemble—and the topes of Afghanistan. The ruins of the Jaytawanarama dagoba still reach the height of 249 ft.; its diameter is 360 ft.; and from base to pinnacle it is covered with trees of the largest size. This enormous structure contains 20 millions of cubical ft.; and sir J. E. Tennent concludes that to erect such a mass of masonry, even in the present day, “would occupy 500 bricklayers from six to seven years,” at the cost of a million sterling. The Ambustella of Mihintala is another remarkable dagoba. A very famous object in connection with Buddhism in C. is the sacred Bo-tree of Anarajapooru (*peepul*, *figus religiosa*), which was planted there 288 years a.c., and is by far the oldest tree in the world of which an authentic history exists. See **BO-TREE**. Amongst the antiquities of C. must be mentioned those wonderful monuments of the former greatness of the Singhalese people—the ruined tanks; with which almost nothing of a similar kind, whether ancient or modern, can be compared; 80 colossal reservoirs, and about 700 smaller tanks, still exist, though for the most part in ruins. The restoration of these magnificent works of irrigation has recently been begun. Brahmanism or Hinduism (q.v. under **INDIA**) is the faith of the Tamils or Malabars, but the Moormen are Mohammedans. After the expulsion of the Dutch Christians, Protestant missions to the natives of C. were commenced by the Baptists in 1813. The Wesleyan Methodists followed in 1814, the Americans in 1816, the church of England in 1818, and Christian instruction has made some progress amongst the native populations. Of these the peasantry of the Kandyan hills have proved the least accessible to its influence. Schools, collegiate institutions, and female seminaries, under the direction of the missionaries, are in successful operation.

*Government.*—The administration of C. is vested in a governor, who is assisted by an executive council of five members, and a legislative council of seventeen members. In the year 1891 there were in existence a number of municipal councils, which, with local boards and village tribunals, give the people a fair measure of self-government. The governor's legislative council of seventeen is also partly elective. The Maldive Islands, lying 600 miles to the west, are a dependency of Ceylon. The colony made very great progress under the able administration of Sir H. Ward. In 1895 the revenue was 20,982,909 rupees. The chief items of revenue are the customs, licenses, sale of government timber and salt, receipts from government railway, etc. The chief exports of Ceylon are cinnamon, cocoanuts, tea, cinchona, plumbago, cacao, cardamon, and coffee.

The Cinghalese, or Singhalese language is spoken in the interior and on the s. coast of the island of Ceylon. It is a modification of the aboriginal Ebu by the Sanskrit, with a tinge of Malay. The Cinghalese has so far degenerated that there is now a material difference between the vernacular and the written language. The former is copious and has a regular grammar. There are 50 letters: 8 vowels, 8 diphthongs, and 34 consonants; but all representing only 30 sounds: 7 vowels and 23 consonants. In literature the language has several original poems of some merit, and an extensive and interesting series of native chronicles, but the most valuable literature is written in Pali. This Pali is one of the Prakrits of ancient India, "which was spoken in the 6th c. before Christ, and has been a dead language for upwards of 2000 years."

The records of C's. early history came to light in 1826, and Mr. Turnour, devoting himself to their study, composed an *Epitome of the History of C.*, from the year 548 B.C. to 1798 A.D.; and he records the reigns of 165 kings, who reigned during this space of 2,341 years. The most famous of the Singhalese books is the *Mahavamsa*, a metrical chronicle, in the Pali language, which gives an account of the island during the above 23 centuries. The story begins with the invasion of Wijayo (548 B.C.), son of a petty Indian sovereign in the country watered by the Ganges. He subdued the Yakkhoas, the aboriginal inhabitants; married a daughter of one of the native chiefs, whom he subsequently repudiated for an Indian princess; and founded a dynasty that held undivided sovereignty in C. for nearly eight centuries. He bestowed on his kingdom his patrimonial name of Sihala (whence Singhalese, Ceylon), and promoted the settlement of colonists from the mainland. In the reign of king Deveniapiatissa (307 B.C.), Buddhism was established as the national religion, and his reign was further remarkable by the planting of the sacred bo-tree, 288 B.C.; and now commenced the erection of those stupendous buildings already noticed. The next important epoch in Singhalese history is the usurpation of the Malabars (287 B.C.), foreign mercenaries from the Coromandel coast, to whom the native sovereigns had intrusted the defense of the island. Several Malabar invasions are chronicled in the history of C., and these foreigners long contended with the native princes for supreme authority. Passing on to 1071 A.D., a native dynasty was then re-established in the person of Wijayo Bahu, which, for 100 years, delivered the country from the dominion of the Malabars. Prakrama Bahu commenced a reign, in 1153, the most renowned in the records of Ceylon. He devoted himself to religion and agriculture, and besides many notable religious edifices, he caused no less than 1470 tanks to be constructed, subsequently known as the "seas of Prakrama." Thirty years after the death of this monarch, the Malabars landed with a large army, and speedily conquered the whole island. In 1285, a native dynasty recovered a part of the kingdom. During the reign of Dharma Prakrama IX. the Portuguese first visited C., 1505; but it was in 1517 that they first formed a permanent settlement at Colombo for trading purposes. Their encroachments soon raised the patriotic Kandyan, and it is a remarkable fact, that though at the first visit of the Portuguese in 1505 they were even ignorant of the use of gunpowder, they, after a while, excelled their enemies as musketeers, and were finally able to bring 20,000 stand of arms to bear against them. "Amity, commerce, and religion," was the Portuguese motto; but their rule in C. is a sad story of rapacity, bigotry, and cruelty. They were at last driven from the island by the Dutch in 1658, after a contest of 20 years, when, as sir J. E. Tennent remarks, "the fanatical zeal of the Roman Catholic sovereign for the propagation of the faith, was replaced by the earnest toil of the Dutch traders to intrench their trading monopolies; and the almost chivalrous energy with which the soldiers of Portugal resisted the attacks of the native princes, was exchanged for the subdued humbleness with which the merchants of Holland endured the insults and outrages perpetrated by the tyrants of Kandy upon their envoys and officers." But the purely military tenure of the Dutch was destined to give place to the colonization of the British. It was during the great European war succeeding the French revolution, that the English gained possession of the island. On the 1st Aug. 1795, an expedition under col. James Stuart landed at Trincomalee, which was speedily captured, and finally the garrison of Colombo surrendered on the 16th Feb. 1796. By this capitulation all the Dutch settlements and strongholds in C. were ceded to the English; though the island was not formally annexed to the British crown till the peace of Amiens, 27th Mar. 1802. The native sovereigns, however, continued in the possession of their mountain territory; but at length the Kandyan king, Wikrama Raja Singha, after perpetrating the most frightful atrocities on his own people, seized and murdered certain native merchants, British subjects, trading to Kandy. War followed, Jan. 1815; Kandy was taken, and the tyrant sent a captive to the fortress of Vellore. On the 2d Mar. 1815, a treaty was concluded with the native chiefs, by which the king was formally deposed, and his territories annexed to the British crown.

Since then, the island has made rapid strides in material prosperity. The mountain-forests have been replaced by plantations of coffee. Many important public works have been completed, and others are still in progress. Several good roads have been constructed, including a magnificent mountain-road between Colombo and Kandy, and in 1895 there were 297 miles of railroad open for traffic. In 1895 there were in the government schools 44,252 scholars; and there are also a large number of mission schools under the control of various religious denominations, besides private schools for the children of Europeans. The total number of scholars at schools of all kinds was 163,834 in 1895.

See *Ceylon, Physical, Historical, and Topographical*, etc., by sir James Emerson Tennent (Lond. 1859); *Christianity in Ceylon*, by the same author (Lond. 1850); *The Statesman's Year-book* for 1897; *Ceylon, a General Description of the Island*, by an officer, late of the Ceylon rifles (1876); *Ceylon*, by Haeckel (1883), and the works of Gordon-Cumming (1891), Carpenter (1892), Ferguson (1898), and Murray (1894).

**CEYX.** See KINGFISHER.

**CEZIM'ERA**, a coast t. of Portugal, in the province of Estremadura, about 18 m. s. of Lisbon. C. has active fisheries, and a pop. of 6000.

**CHABAS**, FRANÇOIS JOSEPH, 1817-82. He devoted himself especially to Egyptian archæology, in which he was considered among the highest authorities. His principal works are *Le Papyrus Magique Harris*; *Voyage in Egypt and Syria*; *Les Pasteurs en Egypte*, and *Studies in Ancient History*.

**CHABASITE.** See ZEOLITE.

**CHABLAIS**, an old division of the province of Annecy in Savoy, now the arrondissement of Thonon, France. It once formed a part of the kingdom of Burgundy. Under the French empire it was a part of the department of Leman; in 1814 its possessions went to Sardinia, and in 1860, with all of Savoy, it was given over to France.

**CHARLIS**, a village in France, dep. of Yonne, which gives name to a much esteemed white Burgundy (q. v.) wine.

**CHABOT**, PHILIPPE DE, abt. 1480-1543; a French general and admiral. He defended Marseilles in 1524, but the next year was made prisoner at Pavia. He was subsequently made admiral, and in 1535 commander in chief. He is said to have been the first to suggest the colonization of Canada. There is a monument to him in the Louvre.

**CHABRIAS**, an Athenian gen. who assumed command about 392 B.C. He defeated the Spartans at Ægina in 388, and again at Naxos in 376. He commanded with Iphicrates and Callistratus at Corcyra, and repulsed Epaminondas before the walls of Corinth. In 366 he was accused of treachery in advising the surrender of Oropus to the Thebans, and was defended by Plato. At the commencement of the social war, in 357, he joined Charos in the command of the Athenian fleet. At the siege of Chios his ship was disabled, but he refused to retire, and was killed while fighting. C. was famous for inventing a new style of receiving a charge, which was on the left knee, the shield resting on the ground, and the spears pointed at the enemy.

**CHACHAPOY'AS**, or SAN JUAN DE LA FRONTERA, a t. in the department of Amazonas, Peru, 410 m. w. of Lima; pop. 5,000. It is on a tributary of the Marañon, in a rich agricultural region.

**CHAC'MA.** See BABOON.

**CHACO, EL GRAN**, a large country in South America, about the middle of the continent. The n. portion is well watered and densely wooded, with intervals of grassy plains and marshes, and capable of producing nearly all tropical vegetation. The s. portion is for the most part a desert and can be cultivated only after irrigation. The n. portion belongs to Bolivia, while the s. is occupied almost entirely by Indians, and is included in the Argentine Republic.

**CHACONNE** (Fr.), an obsolete dance, probably Spanish (*chacón*, from Basque *chocuna*, pretty). The movement is slow, and the music, a series of variations on a ground bass, mostly eight bars in length, appears in sonatas as well as in ballets.

**CHAD, TCHAD, OR TSCHAD** (chad), written also **TSAD**. A lake of Central Africa, between Bornoo on the w., Kanem on the n. e., and Baghirmi on the s. e. It probably extends from n. to s. about 120 or 150 miles; from e. to w. It is variously estimated from 80 to 130 miles. The area extends from 4200 in the dry season to 19,300 sq. m. in the wet season.

**CHAD, SAINT**, bishop of York in the 7th century. He was educated under Aidan at Lindisfarne. At his death he held the see of Lichfield. His day is Mar. 2.

**CHADBOURNE**, PAUL ANSEL, D.D., LL.D., b. Me., 1823; professor of natural history and chemistry in Williams College and in Bowdoin college, and in 1867, chosen president of the university of Wisconsin, at the same time becoming professor of metaphysics. He was elected president of Williams college in 1872; resigned in 1880; and became president of the Massachusetts Agricultural College in 1882. He was author of *Natural Theology*, and *Instinct in Animals and Men*, and editor of *The Wealth of the United States*. He d. 1883.

**CHADWICK**, SIR EDWIN, C.B., a distinguished social and sanitary reformer, b. in the vicinity of Manchester, England, 24th Jan., 1801. He studied law, but, early devoting his attention to questions of social, sanitary, and political science, he attracted the notice of lord Grey's government, by whom he was appointed an assistant-commissioner to inquire into the operation of the poor-laws in England and Wales. His report, published with others in 1833, commanded most attention, being remarkable alike for the wide and searching character of its investigations, the happiness of its illustrations, and the convincing proofs it furnished as to the necessity of reform in the system of

administration. Its merit was recognized by those who had the power to reward him; and on the organization of the new poor-law board, C. was appointed secretary. In connection with this board, and the general board of health, C. for twenty years was energetic in the origination and administration of remedial measures relative to the distribution of poor-law funds, and to the sanitary condition of the country. He likewise gave much attention to the constitution of the constabulary force, with a view to the better prevention of offenses and the readier detection of criminals. On a change being made in the board of health, in 1854, C. retired with a pension. He subsequently took great interest in promoting competitive examinations for government offices, and indeed in almost all questions of social economy. He was long an active member of the association for the promotion of social science. In 1859-60, he collected evidence for the education commission. He died in 1890.

**CHADWICK, GEORGE WHITFIELD**, American composer, b. in Lowell, Mass., Nov. 18, 1854. He studied under Eugene Thayer, and in 1877 went to Europe and placed himself under Jadassohn and Reinecke in Leipzig, and studied the organ and composition under Rheinberger in Munich. Returning to America in 1880, he became organist in the South Congregational church, Boston, and instructor in harmony and composition in the New England Conservatory of Music. His works include: *The Viking's Last Voyage*, 1881; overture to *Rip van Winkle*; and music for the *Columbian Ode*, sung at the opening of the World's Exposition at Chicago, in 1893.

**CHADWICK, JOHN WHITE**, b. Mass., 1840. Leaving school at the age of 13 years, he worked at the trade of shoemaking until 1857, when he entered the normal school. He afterwards graduated from Exeter Academy and the Harvard divinity school. He has been pastor of the second Unitarian society in Brooklyn since 1864. C. is one of the leaders of the rationalistic school of Unitarianism. His works are: *A Book of Poems*; *The Bible of To-day*; *The Faith of Reason*; *The Man Jesus*; *Some Aspects of Religion*; *Belief and Life*; *Old and New Unitarian Belief* (1894), and many articles in magazines.

**CHERONEIA**, a city of Bœotia, in ancient Greece, near the Cephissus, on the borders of Phocis. It is celebrated on account of several important battles fought in the neighborhood. In 447 B.C., the Bœotians here obtained a victory over the Athenians; and in 338 B.C., Philip of Macedon signally defeated the united forces of the Athenians and Bœotians, and so crushed the liberties of Greece. A mound of earth, about a mile from the modern village of Kapurna, which occupies the site of the old city, still marks the place where the Thebans who fell in the battle were buried; and a magnificent lion, which Col. Mure pronounced to be "the most interesting sepulchral monument in Greece," was excavated from this tumulus some years ago. At C., also, 86 B.C., Sulla defeated the generals of Mithridates. Plutarch was a native of this town.

**CHETODONTIDÆ**, a family of acanthopterous fishes, nearly corresponding to the genus *Chatodon* (Gr. hair-tooth) of Linnæus; and also named *SQUAMIPENNES* (Lat. scaly-finned), because of the most distinctive character of the family, the incrustation of the soft portions of the dorsal and anal fins, and often of the spinous parts also, with scales, the fins appearing to taper gradually out of the thickness of the body, which is in general remarkably compressed, so that, without dissection, it is impossible to tell where they begin. The scales are strongly ctenoid (q.v.). The typical genus *Chatodon*, and those most nearly allied to it, have hair-like teeth, so that their jaws resemble brushes; some fishes of the family, however, have trenchant teeth on the jaws, and some, as *Brama* (q.v.), have card-like teeth both on the jaws and palate. Most of the C. are tropical; only one species, *Brama raii*, is ever found in the British seas. They generally frequent rocky shores. Their colors are often extremely gay, and usually disposed rather in stripes or bands than in spots. See illus., *Fishes*, vol. VI.

**CHAFER**, a common name of those beetles or coleopterous insects, which either in the perfect or larva state, are destructive to plants; particularly those which devour the wood, bark, or roots of trees. From these, however, it is sometimes extended to some coleopterous insects which have no such habit. The word C. is seldom used alone, but generally as part of a name, with some prefix; thus, we have *cock-chaffer*, *rose-chaffer*.

**CHAFF-CUTTER**, a name commonly given to an implement now much used by farmers for cutting hay and straw into half-inch lengths. The advantage of this consists not so much in facilitating mastication or digestion, as in preventing animals from wasting their food.

**CHAFFEE**, a central co. of Colorado; formed 1879; drained by the Arkansas river; 1150 sq.m., pop. '90, 6612. Co. seat, Buena Vista.

**CHAFFINCH**, *Fringilla coelebs*, one of the most common British birds, a species of finch (q.v.), and probably that to which the name finch, now so extended in its signification, originally belonged; *fnk*, the German form of the name, and *pink* and *twink*, English provincial forms still appropriated to the C., having some resemblance of sound to its common call-note. The whole length of the C. is about 6 inches. The tail is very slightly forked. The male, in summer, has the top of the head and nape of the neck bluish-gray; the back, chestnut; the wings almost black, with two conspicuous white bars; the tail, nearly black. The colors of the female are much duller than those of the male. The C. is a very widely distributed species, being found in almost all

parts of Europe, in some parts of Asia, in the n. of Africa, and as far w. as the Azores. In the colder northern countries, it is migratory; in more southern regions, it is stationary. Linnaeus gave it the specific name *caelebs*, from observing that the flocks congregated in winter in Sweden consisted chiefly of males, the females having, as he supposed, sought a milder climate. A partial separation of the sexes is observed also in the great winter-flocks in Britain, but it is only partial; and Yarrell thinks that the young males of the previous season, which resemble the females in plumage, are associated with them, and have been mistaken for them. The flocks seen in Britain in winter are believed to be augmented by migration from Scandinavia. The eggs are usually 4 or 5 in number, of pale purplish buff color, sparingly streaked and spotted with reddish brown. The C. feeds chiefly on insects, and does much service in summer by destroying aphides and caterpillars; but eats also seeds, and is sometimes persecuted, because in spring it pulls up and eats young turnips and radishes when in the seed-leaf. Great numbers of chaffinches are killed for the table in Italy. In Germany, this bird is in the highest esteem as a song-bird. Its notes are very clear and loud.

**CHAGRES**, a river entering the gulf of Darien on the n. side of the isthmus of Panama, near lat.  $9^{\circ} 18'$  north. Though, towards its mouth, it varies in depth from 16 to 80 ft., it is yet, by reason at once of its rapidity and its falls, but little available for navigation. At its entrance is a port of its own name. Both the town, however, and the stream have recently lost nearly all the advantages of their position, through the establishment of an inter-oceanic railway, which, on the Atlantic side, commences at Aspinwall, about 8 m. to the north.

**CHAILLE-LONG**, CHARLES, b. Md., 1840; served in the federal army during the civil war, and on the general staff of the Egyptian army, 1871-72, with rank of Lieut.-col. In 1874 he was made second in command of the force operating for the suppression of the slave trade on the White Nile, under General Charles G. Gordon. In 1874-75, he visited the country and court of Uganda, and explored the upper waters of the Victoria Nile. In 1876 he commanded the Egyptian expedition which occupied and annexed Zoula in East Africa. In 1883 he became U. S. vice-consul at Alexandria, Egypt; and rendered important services during the Alexandria massacre, and subsequent bombardment by the English squadron, for which he received the order of the Mejdja from the khedive. He wrote *African Travels*, *The Three Prophets* (1886), *Central Africa* (1887), etc.

**CHAIN**, in surveying (called Gunter's chain, from its inventor), is a measure of 22 yards long, composed of 100 iron links, each of which is thus 7.92 in. long. As an acre contains 4,840 sq. yards, 10 sq. chains ( $22 \times 22 \times 10 = 4,840$  sq. yards), or 100,000 sq. links, make an acre.

**CHAIN-BRIDGE.** See SUSPENSION BRIDGES.

**CHAIN-CABLE.** See CABLE.

**CHAIN-MAIL**, or **CHAIN-ARMOR**, much used in the 12th and 13th centuries, consisted of hammered iron links, connected one to another into the form of a garment. Such armor was much more flexible and convenient to the wearer than that which was formed of steel or brass plates, but was less fitted to bear the thrust of a lance.

**CHAINS**, **HANGING IN**. In atrocious cases, it was usual for courts of justice, in former times, to direct the bodies of malefactors, after execution, to be hung in C. upon a gibbet near the spot where the crime was committed; but this, says Blackstone, "was no part of the legal judgment." The reasons commonly assigned for the practice are two: first, that it might strike terror into other offenders; and second, that it might afford "a comfortable sight to the relations and friends of the deceased." This barbarous adjunct to capital punishment was not finally abolished till a very recent period, and it may surprise our readers to learn that, two years after the passing of the reform bill, it was still in accordance with the law, if not with the custom of England.

**CHAIN SNAKE**, or **KING SNAKE**, an American serpent, haunting moist or shady places, and feeding upon mice, moles, small birds, and reptiles. It is remarkable for the beauty of its colors, the ground-work on the upper part of the body being a lustrous black, while the scales are marked with white spots. The head is very small.

**CHAIX D'EST ANGE**, GUSTAVE LOUIS VICTOR ADOLPHE CHARLES, 1800-76; a French barrister; appointed *procureur général* at the imperial court, Paris, 1857; also councillor of state and senator of the empire. In 1863 he was vice-pres. of the council of state; and in 1864 was appointed pres. of public works and fine arts. He was made a commander of the Legion of Honor, and, in 1891, a grand officer. As a commissioner of the government he presented to the senate, 1868, a report on the petition of the Rom. Catholics, demanding free superior instruction. He was also prominently engaged in the events of 1880 and 1884.

**CHAJUG**, or **CHJUG**, JEHUDA BEN-DAVID, b. about 1080; regarded by Jewish critics as the first of Hebrew grammarians. He made some very remarkable and valuable discoveries in philology.

**CHALA'ZA**, in botany, a membrane which unites the nucleus and integuments at the base of an ovule. It is traversed by vessels which supply nourishment to the ovule. It is often of a different color from the rest of the integuments, and is conspicuous in the

ripened seed; but it is sometimes difficult to distinguish it, particularly in *orthotropical* seeds, when it is in contact with the *hilum*, the *foramen* or *micropyle* being at the opposite extremity of the seed. See OVULE and SEED.

The cords which bind the yolk-bag of an egg to the lining membrane at the two ends of the shell, and keep it near the middle as it floats in the albumen, are also called *chalazæ*. They appear to be formed of a peculiarly viscid albumen.

**CHALCEDON**, a city of ancient Bithynia, at the entrance of the Euxine, opposite to Byzantium. It was founded 684 B.C. by a colony from Megara, and soon became a place of considerable trade and importance. It contained several temples, one of which, dedicated to Apollo, had an oracle. C. was taken by the Persians, suffered the vicissitudes of war during the strife for Grecian supremacy between the Athenians and Lacedæmonians, and finally merged into the Roman empire. During the Mithridatic war, it was the scene of a bold exploit of the Pontic sovereign. Having invaded Bithynia, all the wealthy Romans in the district fled for refuge to C., whereupon he broke the chains that protected the port, burned four ships, and towed away the remaining sixty. Under the empire it was made a free city, and was the scene of a general council, held 451 A.D. Chosroes the Persian captured it 616 A.D., after which it declined, until it was finally demolished by the Turks, who used its ruins to build mosques and other edifices at Constantinople. C. was the birthplace of the philosopher Xenocrates.

The *council* of C., to which allusion has been made, was the fourth universal council, and was assembled by the emperor Marcian for the purpose of drawing up a form of doctrine in regard to the nature of Christ, which should equally avoid the errors of the Nestorians (q.v.) and Monophysites (q.v.). Six hundred bishops, almost all of the eastern or Greek church, were present. The doctrine declared to be orthodox was, that in Christ there were two natures, which could not be intermixed (this clause was directed against the Monophysites), and which also were not in entire separation (this was directed against the Nestorians), but which were so conjoined, that their union destroyed neither the peculiarity of each nature, nor the oneness of Christ's person.

**CHALCEDONY** (often misspelled *calcedony*), a beautiful mineral of the quartz family, or rather a variety of quartz, from which it does not differ in chemical composition or in any essential character. It derives its name from Chalcedon in Bithynia, near which it is found in considerable abundance, and has been known by the same name from ancient times. It occurs in different kinds of rock, but most frequently in old lavas and trap-rocks, and is found in almost all parts of the world where these exist, or where there are boulders derived from them. It is common in Scotland, and specimens of great beauty are brought from Iceland and the Farøe islands. It never occurs in crystals. It constitutes the whole or the principal part of many agates. It is generally translucent, sometimes semi-transparent, has not much luster, and is in color generally white or bluish white, sometimes reddish white, sometimes milk-white, less frequently gray, blue, green, yellow, brown, or even black. Its fracture is even, or very slightly conchoidal. —C. is much used in jewelry, for brooches, necklaces, and ornaments of all sorts, the largest pieces being sometimes made into little boxes, cups, etc. It was much used by the ancients, and many beautiful engraved specimens appear in antiquarian collections. Chalcedonies with disseminated spots of brown and red, were once very highly prized, and were called *stigmities* or *St. Stephen's-stones*. Petrified plants are sometimes found in C., in which they appear to have been encased whilst it was in course of formation. Specimens of C. are sometimes found enclosing a little water in the interior, which gives them a very beautiful appearance; but the water easily escapes, to prevent which, rings or other ornaments made of such stones are kept in distilled water, when not worn. The ancients set a very high value on these *enhydrites* (Gr. *en*, in, and *hydor*, water). The Vincentin was celebrated for producing them.

**CHALCEDONYX** (or, erroneously, *calcedonyx*), a name given to agates formed of cacholong, or a white opaque chalcedony, alternating with a grayish translucent chalcedony.

**CHALCHIHUITL**, a stone held in great repute by the ancient Mexicans, and still by the Indians of that country, who fashion it into ornaments and occasionally use it in trade. It is a turquoise found in the mountains not far from Santa Fé. The mines were exhausted before the coming of the Spaniards. The stone was valued by the Mexicans more highly than gold.

**CHALCIS**, a genus of Saurian reptiles, the type of a family called *chalcidæ*, some of which are popularly termed snake-lizards, because of the resemblance to snakes in the elongated form of the body, the limbs being also remarkably small, so that this family forms one of the transition links between the Saurian and the Ophidian reptiles. The scales are rectangular, and arranged in transverse bands, without being imbricated or disposed like tiles. The *chalcidæ* are natives of warm climates, both in the old and new worlds.

The name C. has also been bestowed on a genus of the order *hymenoptera*, allied to the ichneumons, which has become the type of a tribe or family, containing a vast number of species—1500 being supposed to exist in Britain—all of them of small size, many very minute, many of them very brilliant in their colors, and the larvæ of all of them parasitic

in the larvæ or pupæ, some even in the eggs, of other insects. The chrysalis of a butterfly or moth often nourishes a great number of these parasites; and they become useful in preventing the excessive multiplication of species which destroy valuable plants.

**CHALCIS**, the capital t. of the island and government of Eubœa, Greece, situated on the Euripus, a strait separating the island from Bœotia, and which at this point is only 120 ft. wide. The Euripus is divided into two channels, of unequal breadth and depth, by a rock, which is surmounted by a castle, partly of Venetian and partly of Turkish construction. A stone bridge, of some 70 ft. in length, connects the rock with the Bœotian shore, while a wooden and movable bridge, of about 85 ft., unites it with Chalcis. C. is a place of very great antiquity, having been founded, as tradition asserts, before the Trojan war, by an Ionian colony from Athens. Its rise was rapid. It sent out numerous colonies, and was the center of the trade of the western Mediterranean. Governed at first by an aristocracy, it fell into the hands of the Athenians, who in 506 B.C. divided the lands of C. amongst some of their own number. It subsequently fell under the power of the Macedonians and Romans, and was at this time a place of great military importance, nearly 9 m. in circumference, and had many fine temples, theaters, and other public buildings. Aristotle died at Chalcis. In the middle ages, it was prosperous under the Venetians, who held it for nearly three centuries, until its conquest by the Turks in 1470. The lion of St. Mark is, or was until within recent years, still to be seen over the gateway between the bridge and the citadel. Not many ancient remains now exist at Chalcis. The streets are narrow, but the houses, many of which owe their origin to the Venetians, are substantial and spacious. It suffered from an earthquake in 1894. Pop. about 9900.

**CHALCOGRAPHY**, a pedantic term used to signify engraving on copper, compounded of the Greek words *chalkos*, brass or copper, and *grapho*, I write. The term is inaccurate when applied, as it often is, to engraving on other metals, such as steel and zinc. For zinc-engraving the still more objectionable word *incography* has been invented.

**CHALDE'A**. See **BABYLON**, **BABYLONIA**.

**CHALDEAN CHRISTIANS**, a branch of Nestorians who acknowledge the pope of Rome. They use the eastern rite, and are under the patriarch of Babylon. They are supposed to number about 70,000. See **NESTORIANS**.

**CHAL'DEE**. See **ARAMÆA**.

**CHALDER**, an old Scotch dry measure, containing 16 bolls. See **BOLL**.

**CHALDERON** (Lat. *caldarium*, a vessel for warm water), an old dry measure used in selling coal, and containing 86 heaped bushels. Coal is now sold by weight.

**CHALET** is the French-Swiss name for the wooden summer hut of the Swiss herdsmen on the mountains, but the term is also extended to include Swiss houses generally, and picturesque and ornate villas built in imitation of them.

**CHALEUR BAY**, an inlet of the gulf of St. Lawrence, between Gaspé, a district of Lower Canada, and New Brunswick, having a depth of 90 m. from e. to w., and a width varying from 12 to 20. The Restigouche, which enters the gulf from New Brunswick at its very head, marks, at its mouth, the interprovincial boundary.

**CHALICE** (Lat. *calix*, a cup). This ancient name for an ordinary drinking-cup has been retained for the vessels used for the wine in the holy sacrament. Chalices are commonly made of silver, but it was not unusual for them to be of gold, or gilt and jeweled. Chalices were also made of glass, crystal, and agate; but these substances have been abandoned, in consequence of their fragile nature. The C. is the attribute of St. John the evangelist.

**CHALK**, a soft earthy variety of limestone or carbonate of lime, forming great strata, and claiming the attention of the geologist even more than of the mineralogist. It is generally of a yellowish-white color, but sometimes snow-white. It is easily broken, and has an earthy fracture, is rough and very meager to the touch, and adheres slightly to the tongue. It generally contains a little silica, alumina, or magnesia, sometimes all of these. Although often very soft and earthy, it is sometimes so compact that it can be used as a building-stone; and it is used for this purpose either in a rough state, or sawn into blocks of proper shape and size. It is burned into quicklime, and nearly all the houses in London are cemented with mortar so procured. The siliceous particles being separated by pounding and diffusing in water, it becomes whiting, of which the domestic uses are familiar to every one. Carpenters and others use it for making marks, which are easily effaced: the blackboard and piece of C. are now common equally in the lecture-rooms of universities and in the humblest village-schools. C., perfectly purified, is mixed with vegetable coloring matters, such as turmeric, litmus, saffron, and sap green, to form pastil colors; but vegetable colors which contain an acid are changed by it. See **CRAYON**. The *Vienna white* of artists is simply purified chalk. In a perfectly purified state, it is administered as a medicine, to correct acidity in the stomach. C. is also extensively used as a manure. See **LIME**, as a manure.

**CHALK, BLACK**, is a mineral quite different from common chalk, and apparently receives its name from resembling it in meagerness to the touch, in soiling the fingers,



and in being used for drawing, writing, etc. It is also called **DRAWING-SLATE**. It is of a slaty structure, of a bluish or grayish-black color, easily cut and broken, and makes a perfectly black mark on paper. It is used for drawing, and as a black color in painting. It becomes red by exposure to heat. It is essentially a kind of clay (q.v.), and derives its color from carbon, which it contains. It is found in primitive mountains, in Spain, France, Italy, etc., also in the coal formation in Scotland.—**BRIANÇON CHALK** and **FRENCH CHALK** are popular names for soapstone.—**RED CHALK** is *ochery red clay-iron-ore*, consisting of clay and much peroxide of iron. It is of a brownish-red color, and a somewhat slaty structure, the cross fracture earthy. The coarser varieties are used chiefly by carpenters for making marks on wood; the finer, by painters. It occurs in thin beds in clay-slate and grauwacke-slate in some parts of Germany.

**CHALK-BEDS.** See **CRETACEOUS GROUP**.

**CHALKING THE DOOR**, a mode of warning tenants to remove from burghal tenements, long known and still in use in Scotland. The practice is thus described by Mr. Hunter in his valuable work on Landlord and Tenant: "A burgh-officer, in presence of witnesses, chalks the most patent door forty days before Whitsunday, which is held to be a legal warning. There is no execution at the parish church, but the officer makes out an execution of 'chalking,' in which his name must be inserted, and which must be subscribed by himself and two witnesses. This ceremony now proceeds simply on the verbal order of the proprietor, but anciently the interposition of a judge was requisite. In such a case, authority was given by one of the magistrates to the burgh-officer."

**CHALKLEY, THOMAS**, 1675-1741; a Quaker preacher, native of London. He came to America in 1698, and traveled in Virginia, Maryland, and the New England colonies. Returning to England, he married, and soon afterwards came back and settled in Philadelphia. Again he crossed the sea and traveled in Holland and Germany; thence he went to the West Indies, where he died while engaged in missionary work. In his will he founded the library of the four monthly meetings of Friends in Philadelphia. His journal of his life and labors was published in 1747.

**CHALKY ISLAND**, in New Zealand, near the s.w. extremity of Middle Island, about lat. 46° s., and long. 166° 20' east. It takes its name from being composed of a mass of white limestone, and imparts the same to the adjacent bay of 16 m. in length, and also to one of the harbors of the inlet.

**CHALLENEL-LACOUR, PAUL-AMAND**, 1827-96. He was prof. of philology at Pau, France, when only 22 years of age; was a brilliant journalist, and with Targé and Ranc founded the *République Française*, the great liberal paper of Paris. He was a noted republican, and a strenuous opponent of the second empire, having been banished as early as 1852 for his political opinions. He translated Ritter's *History of Philosophy*, and edited the works of Madame d'Epinay; was prefect of the Rhone, commissioner extraordinary for the Republic during the Franco-Prussian war, ambassador to Great Britain in 1880-82, minister of foreign affairs in 1883, re-elected senator in 1885, and became president of the senate in 1893.

**CHALLENGER EXPEDITION**, a scientific exploration of the open sea sent out by the British Government in 1872-78. In 1872, the *Challenger*, a corvette of 2806 tons, was completely fitted out and furnished with every scientific appliance for examining the sea from surface to bottom, e.g., with natural history work-room, chemical laboratory and aquarium. The ship was placed in charge of a naval surveying staff under Captain Nares and of a scientific staff, with Professor Wyville Thomson at their head, for the purpose of sounding the depths, mapping the basins, and determining the physical and biological conditions of the Atlantic, the Southern and Pacific Oceans. The *Challenger* weighed anchor at Sheerness on December 7, 1872, and on May 24, 1876, dropped anchor at Spithead, having in these three and a half years cruised over 68,900 nautical miles. Investigations were made at 862 stations, at each of which were determined the depth of channel, the bottom, surface and intermediate temperatures, currents, and fauna, and the atmospheric and meteorological conditions. The route was by Madeira, the Canaries, the West Indies, Nova Scotia, Bermudas, Azores, Cape Verd, Fernando Noronha, Bahia, Tristan d'Acunha, Cape of Good Hope, Kerguelen, Melbourne, the Chinese Sea, Hong Kong, Japan, Valparaiso, Straits of Magellan, Montevideo, Vigo, and Portsmouth. Between the Admiralty Islands and Japan the *Challenger* made her deepest sounding, 4575 fathoms, the deepest sounding on record except two. See the copious *Reports on the Scientific Results of the Voyage of H. M. S. Challenger*, edited by Sir Wyville Thomson and Dr. John Murray. They fall into a *Narrative* (2 vols., 1883-86), *Zoology* (80 vols., 1880-89), *Physics and Chemistry* (8 vols., 1884-89), *Botany* (2 vols., 1885-86).

**CHALLONER, RICHARD**, 1691-1781; the son of an English dissenter, but brought up among Roman Catholics, whose religion he embraced. He was ordained a priest at Douay, and made professor in the faculty. In 1780, he held the English mission in London, where he published several religious works. In 1758, he became vicar apostolic, residing generally in London; but during the "No Popery" riots of 1780, he retired into the country. He was the author of numerous controversial and devotional works.

the most popular one being *The Garden of the Soul*, which has been frequently reprinted, and translated into various languages. He revised the Douay Bible (in English); and as an antidote to Foxe's well-known *Martyrology*, he wrote *Memoirs of Missionary Priests and Other Catholics of both Sexes, who suffered Death or Imprisonment in England on Account of their Religion*.

**CHALMERS, ALEXANDER**, 1759-1834, Scottish editor and author; compiled the *General Biographical Dictionary* in 32 vols. (1812-19); edited *British Essayists*, in 45 vols.

**CHALMERS, GEORGE**, an eminent historical antiquary, was b. at Fochabers, Morayshire, Scotland, in 1742. Having attended King's college, Aberdeen, and afterwards studied law at Edinburgh, he went in 1768 to North America, where he practiced as a lawyer till the breaking out of the war of independence. Being a keen loyalist, he returned to Britain, where he was appointed clerk to the board of trade in 1786. The duties of this office he continued to discharge with diligence and ability till his death in 1825. Before his appointment, he had distinguished himself by various publications in political economy; and for some time after he devoted himself chiefly to editing the works of various authors and writing biographies. His great work is his *Caledonia; an Account, Historical and Topographical, of North Britain*; a production displaying profound research into the history of Scotland, and abounding in varied erudition.

**CHALMERS, JAMES RONALDS**, American politician, b. Va., 1831; removed to Miss., 1839; was a general in the confederate army, and was afterwards several times elected to Congress, but was deprived of his seat in the XLVIIIth congress, and was deprived of his certificate of election to the XLVIIIth congress, — as he claimed, illegally.

**CHALMERS, THOMAS, D.D., LL.D.**, was b. at Anstruther, in Fifeshire, 17th Mar., 1780, educated at the university of St. Andrews, and in his 19th year licensed to preach the gospel. In 1803, he was ordained minister of the parish of Kilmany, in Fifeshire, about 9 m. from St. Andrews. At this period his attention was entirely absorbed by mathematics and natural philosophy, to the neglect of the studies appertaining to his profession. To gratify his love of scientific pursuits, he even formed mathematical and chemistry classes in St. Andrews during the winter of 1803-04, and by his wonderful enthusiasm and lucidity of exposition excited intense interest, and obtained for himself a great reputation. In 1808, he published an *Inquiry into the Extent and Stability of National Resources*, which proved his capacity for dealing with questions of political economy. Shortly after this, certain domestic calamities, and a severe illness of his own, opened up the fountains of his soul, and rendered him keenly susceptible to religious impressions. Having to prepare an article on Christianity for Brewster's *Edinburgh Encyclopædia*, he commenced an extensive study of the evidences, and rose from his investigations convinced that Christianity was a *fact*, and the Bible the veritable "word of God." Then the great genius of the man broke forth like sunshine. He grew earnest, eloquent, devout, and faithful to his pastoral duties. In July, 1815, he was translated to the Tron church and parish, Glasgow, where his magnificent oratory took the city by storm. His *Astronomical Discourses* were probably the most sublimely intellectual and imaginative that had ever been preached in a Scottish pulpit. They were published in 1817, and had a prodigious popularity. During the same year he visited London, where his preaching excited as great a sensation as at home. But C.'s energies could not be exhausted by mere oratory. Discovering that his parish was in a state of great ignorance and immorality, he began to devise a scheme for overtaking and checking the alarming evil. It seemed to him that the only means by which this could be accomplished was by "revivifying, remodeling, and extending the old parochial economy of Scotland," which had proved so fruitful of good in the rural parishes. In order to wrestle more closely with the ignorance and vice of Glasgow, C., in 1819, became minister of St. John's parish, "the population of which was made up principally of weavers, laborers, factory-workers, and other operatives." "Of its 2,000 families," says Dr. Hanna, "more than 800 had no connection with any Christian church, while the number of its uneducated children was countless." We have not space to narrate at length how vast and successful were the labors of Chalmers. It is sufficient to say, that in pursuance of his favorite plan, he broke up his parish into 25 districts, each of which he placed under separate management, and established two week-day schools, and between 40 and 50 local Sabbath-schools, for the instruction of the children of the "poorer and neglected classes," more than 1000 of whom attended. In a multitude of other ways he sought to elevate and purify the lives of his parishioners.

But such herculean toils began to undermine his constitution, and in 1823 he accepted the offer of the moral philosophy chair in St. Andrews, where he wrote his treatise on the *Use and Abuse of Literary and Ecclesiastical Endowments* (1827). In the following year he was transferred to the chair of theology in Edinburgh, and in 1832 published a work on political economy. In 1833 appeared his Bridgewater treatise, *On the Adaptation of External Nature to the Moral and Intellectual Constitution of Man*. It was received with great favor, and obtained for the author many literary honors; the Royal Society of Edinburgh electing him a fellow, and the French Institute a corresponding member, while the university of Oxford conferred on him the degree of D.C.L. In 1834, he was appointed convener of the church-extension committee; and after seven years of enthusiastic labor, announced that upwards of £300,000 had been collected from the nation, and 220 new churches built. Meanwhile, however, troubles were springing up in the bosom of the church itself. The evangelical party had become predominant in the gen-

eral assembly, and came forward as the vindicators of popular rights; the struggles in regard to patronage between them and the "moderate" or "Erastian" party became keener and more frequent, until the decision of the civil courts in the famous "Auchterarder and Strathbogie" cases brought matters to a crisis; and on the 18th of May, 1848, C., followed by 470 clergymen, left the church of his fathers, rather than sacrifice those principles which he believed essential to the purity, honor, and independence of the church. See FREE CHURCH. The rapid formation and organization of the Free Church were greatly owing to his indefatigable exertions, in consequence of which he was elected principal of the Free Church College, and spent the close of his life in the zealous performance of his learned duties, and in perfecting his *Institutes of Theology*. He died suddenly at Morningside, Edinburgh, May 30, 1847.

This is not the place for a criticism on the works of C., which extend to more than 30 volumes. It is sufficient to say, that they contain valuable and, in some cases, original contributions to the sciences of natural theology, Christian apologetics, and political economy; while on minor topics, such as the church-establishment question, they exhibit both novelty and ingenuity of argument. As an orator, C. was unique and unrivaled. We read of men, in the history of the Christian church, whom we can believe to have been as eloquent, impassioned, and earnest, but nowhere do we encounter a man in whom intellect, feeling, and imagination were so harmoniously combined—a nature so "nobly planned, to warn, to comfort, and command." Scotland never produced a greater or more lovable soul, one more gentle, guileless, genial-hearted, or yet more fervid, from the strength of a resolute and irresistible will, before whose impetus difficulties were dashed aside as by a torrent. There have been some loftier and more purely original minds in Scotland than C.'s, but there has never been a truer one, nor a heart whose Christian faith and piety were more intense, sincere, and humane.

**CHÂLONS-SUR-MARNE**, a t. of France, in the department of Marne, 107 m. e. of Paris by railway. It stands on the right bank of the river Marne, which is here crossed by a handsome stone bridge. C. is old; and the houses consist chiefly of timber, lath, and plaster. The situation, however, is agreeable, and the town contains some fine public buildings, the principal of which is the cathedral, in the sanctuary of which there is one of the finest grand altars in France. On the east side of the town there is the splendid *Promenade du Jard*, or park, which covers 19 acres. C. has manufactures of woollens, cotton, leather, etc., and a considerable trade in grain, hemp, rape-seed oil, and Champagne wine. Pop. '91, 25,868. Previous to the union of Champagne with France in 1284, the population numbered about 60,000. In 1856, Napoleon III. formed the celebrated camp of C. to the n.e. of the town, which was occupied during the Franco-Prussian war by Canrobert, and afterwards by MacMahon. On the night of Aug. 21, 1870, MacMahon withdrew his troops; and next day the town was occupied by the Germans.

**CHÂLON-SUR-SAÔNE**, a t. of France, in the department of Saône-et-Loire, about 33 m. n. of Mâcon. It is situated on the right bank of the Saône, at the point where that river is joined by the Canal-du-Centre, which unites the Saône with the Loire, and secures C. an extensive traffic with the central districts of France, as well as with the Mediterranean and Atlantic. The town is generally well built, good quays line the river, along which also the finest houses extend. Vineyards, wood, meadows, and cultivated fields surround and add variety and beauty to the situation. Its manufactures include hats, hosiery, vinegar, oil, pottery, jewelry, and imitation pearls; and it has a large trade in the agricultural and other produce of the district. Steamboats navigate the Saône from C. downwards. Pop. '91, 24,686. C. occupies the site of the ancient *Cabillonum* or *Caballinum*.

**CHALOTAIS**, LA, LOUIS RENÉ DE CARADEUC, 1701-85; procureur-general of the parliament of Brittany, where he was a decided opponent of Jesuits. Grimm asserts that Chalotais's reports led to the suppression of the Jesuits in France. Voltaire gave C. high praise for his essay on national education. Later in life he was subjected to long political persecution, but was finally found free of blame, and resumed his place in the parliament at Rennes.

**CHALYBÆUS**, a genus of birds very closely allied to the baritahs (q. v.), but having a rather thicker bill, and the nostrils pierced in a broad membranous space. The species are natives of New Guinea, and are birds of the most beautiful plumage, remarkable for the brilliancy of their metallic tints, and particularly for the resemblance to burnished steel, to which they owe their name (Gr. *chalyps*, -ybos, steel). On this account, they are sometimes included under the name of birds of paradise; and the skin of *C. paradiscus*, deprived of its feet, is sold as that of a bird of paradise.

**CHALYBÆUS**, HEINRICH MORITZ, a German philosopher, was b. 8d July, 1796, at Pfaffroda, in Saxony, and educated at Leipsic. After spending some years in teaching, he was appointed in 1839 professor of philosophy in the university of Kiel, where he remained till his death in 1862. His chief works are the *Historische Entwicklung der speculativen Philosophie von Kant bis Hegel* (1836—English translations by Edersheim and Tulk); *System der speculativen Ethik* (1850); *Philosophie und Christenthum* (1853); and *Fundamental Philosophie* (1861).

**CHALYBEATE WATERS** are those which contain a considerable portion of iron in solution. They are of two kinds, *carbonated* and *sulphated*. The *carbonated C. W.* contain carbonate of iron,  $\text{FeO.CO}_2$ , dissolved in excess of carbonic acid, and may be recognized by forming an ochry deposit of red oxide of iron ( $\text{Fe}_2\text{O}_3$ ) on the surface of the stones near the mouths of the springs, owing to the escape of the carbonic acid on exposure to the air. Islington Spa near London, Tunbridge Wells, and Oddy's Saline C. W. at Harrogate, are examples of this class. Where an excess of carbonic acid is present, communicating a sparkling aspect to the water and an acidulous taste, as at Pyrmont and other places, the term *acidulo-chalybeate* or *acidulo-ferruginous* is applied. The *sulphated C. W.* contain sulphate of iron  $\text{FeO.SO}_2$ , dissolved in them, and examples of this class are afforded at the Isle of Wight (the Sand Rock spring), Vicars bridge, Moffat, etc. C. W. are characterized by a more or less inky or styptic taste; by becoming of a purplish black tint when infusion of galls or tea, and some varieties of wine, are added; and by giving a pale blue color on the addition of a few drops of ferrocyanide of potassium (yellow prussiate of potash). C. W. are of great service in cases of debility, and the *acidulo-carbonated* kind being lighter on the stomach, is generally preferred; but all C. W. are to be avoided in plethoric, febrile, and inflammatory conditions of the system. See MINERAL WATERS.

**CHALYBITE.** See IRON.

**CHAM, or AMÉDÉE DE NOÛ,** 1819-79; b. Paris; the son of a former peer of France; he was intended for the polytechnic school, but preferring painting he studied with Paul Delaroche, and afterwards with M. Charlet, where he developed a talent for the grotesque. Beginning in 1842, he contributed, chiefly to *Charivari* (the *Punch* of France), an immense number of caricatures, and some sketches, under the signature of "Cham." His political cartoons are singularly sharp and effective. He also produced many vaudevilles.

**CHAMA,** a genus of lamellibranchiate mollusks. The shell consists of two unequal valves, having two hinge-teeth in the one valve, and one in the other. The general form of the shell approaches to orbicular. The shell is generally thick, and is foliated with leaf-like projections, which arise in a somewhat regular manner from its surface; these and the colors of some of the species combining to make them very beautiful. The shells of the *chamas* are often called *clams* or *clump* shells, a name which they share with some of the *pectens*, *spondyli*, etc. They are found only in the seas of warm climates, none further n. than the Mediterranean. The Linnæan genus *C.* contained many species now removed to other families, but the restricted genus *C.* is the type of a family *chamidae*. Thirty fossil species have been referred to *C.*

**CHAMADE.** See PARLEY.

**CHAME'ROPS,** a genus of palms, with fan-shaped leaves, less exclusively tropical than palms are in general, and of which one species, *C. humilis*, is the only palm truly indigenous to Europe. It extends as far n. as to the neighborhood of Nice. It is sometimes called the PALMETTO. The flowers are in spathes about 6 to 8 in. long; the fruit is a triple blackish spongy drupe, which is eaten, as are also the young shoots. This palm is so tolerant of a cold climate, that a specimen has lived in the open air in the botanic garden of Edinburgh for more than 50 years, with the protection of matting in very severe winters. In its native regions, the leaves are much used for thatching, and for making brooms, hats, chair-bottoms, etc. They abound in an excellent fiber, which the Arabs mix with camel's hair, and make into tent covers: cordage, and sometimes sail-cloth, are made of it in Spain; it is imported into France, and used for making carpets, under the name of *African hair*. The French in Algeria make paper and pasteboard of it; and it is supposed that it may prove a valuable commercial commodity, as a material for paper-making.—Other species of the genus abundant in India, China, etc., serve similar purposes, and deserve attention in connection with paper.—To this genus belongs also the West Indian palm, which yields the material for chip hats (see BRAZILIAN GRASS); and the palmetto (q.v.) of North America is by some botanists referred to it.

**CHAMALA'RI,** a peak of the Himalaya between Thibet and Botan, in lat. 28° 4' n., and long. 90° e., said to have an elevation of 27,200 ft., or more than 5 m. and a furlong.

**CHAMBA,** a feudatory state of n. India, subordinate to the Punjab government, between 33° and 38° 9' n., and 75° 54' and 76° 30' east. A range of mountains separate C. from Kashmir. C. is about 65 by 50 m. in length and breadth; pop. '91, 124,032. The agricultural products are wheat, Indian corn, rice, hops and millet. Iron ore is found, and there are slate quarries.

**CHAMBER,** of a piece of artillery, or small arm, is a contracted part of the bore, at the breech end. The C. contains the charge of powder, but is too small to contain the shot or shell. Some of these cavities are spherical, some cylindrical, some conical with a hemispherical termination, and some pear-shaped. Carronades and shell guns are usually chambered. The charge just fits the C., and the ball or shell comes in contact with it. Chambered guns are slow to load and fire.

**CHAMBER-MUSIC,** a term to designate music that is specially adapted for performance in a room. The name originally comprised both vocal and instrumental music, but it is now almost restricted to the various combinations of the pianoforte with strings or

strings alone, as duos, trios, quartets, quintets, etc. Beethoven has left some of his greatest thoughts in his string quartets.

**CHAMBER OF COMMERCE**, a body of merchants and traders, associated for the purpose of promoting the interests of its own members, of the town or district to which the society belongs, and of the community generally, in so far as these have reference to trade and merchandise. Of the means by which these objects are sought to be accomplished, the following may be mentioned as the most prominent: 1. By representing and urging on the legislature the views of their members in mercantile affairs; 2. By aiding in the preparation of legislative measures having reference to trade, such, for example, as the bankrupt acts; 3. By collecting statistics bearing upon the staple trade of the district; 4. In some places, by acting as a sort of court of arbitration in mercantile questions; 5. By attaining by combination advantages in trade which might be beyond the reach of individual enterprise.

These institutions are of continental origin, and, like so many others which England has borrowed from that source, were first introduced into Scotland. The oldest C. of C. in France is that of *Marseilles*, which dates from the end of the 14th or commencement of the 15th century. This chamber was invested with very remarkable powers. It shared in the municipal jurisdiction, and in the administration of justice in mercantile questions. It was several times suppressed and re-established, and it was not till 1650 that its powers were fixed, and that it received its ultimate organization. The second chamber in France was that of *Dunkerque*, which was established in 1700. The same year a council-general of commerce was instituted at *Paris*, which, in addition to six councillors of state, consisted of twelve merchants or traders, delegated by the principal commercial towns of the kingdom, an arrangement which led within the next few years to the formation of chambers of commerce everywhere in France. We thus find that the chamber at *Lyon* was instituted in 1702, those of *Rouen* and *Toulouse* in 1703, of *Montpellier* in 1704, of *Bordeaux* in 1705, etc. By an order of council of Aug. 30, 1703, a direct relation was established between these various chambers and the central council of commerce. These chambers were all suppressed by a decree of the national assembly in 1791, but they were re-established by a consular edict in 1802, which fixed the population of the towns in which they might be established, and the number of their members, who were to be chosen from amongst the merchants who had carried on trade in person for a period of not less than ten years. Sixty of the best known merchants, presided over by the prefect or the maire, were charged to elect the members of these new chambers. They then presented to the government two candidates for the office of member of the general council of commerce, instituted at *Paris* under the minister of the interior. This organization was again modified in 1832, and still later by the ordinances of Sept., 1851, and Aug., 1852, by which these bodies are now regulated. In accordance with that decree, the members of these bodies are now elected by the chief merchants of each town chosen for that purpose by the prefect. Their number cannot be less than 9, nor more than 21. They hold office for six years.

The oldest C. of C. in Great Britain is believed to be that of *Glasgow*, which was instituted 1st Jan., 1783, and obtained a royal charter, which was registered at *Edinburgh* on the 31st of the same month. That of *Edinburgh* was instituted in 1786, and incorporated by royal charter in 1786. The *Edinburgh* C. of C. was the first public body which petitioned for the abolition of the corn laws, and the adoption of free-trade principles; and stood almost alone in the United Kingdom in advocating the *Suez* canal project. It also originated the movement that government should undertake the telegraph service in connection with the post-office. Six hundred of the bankers, merchants, and ship-owners of *Edinburgh* and *Leith* constitute the chamber. The *Manchester* chamber, since so famous for its exertions in the cause of free-trade, was not established till 1820, and for many years it continued to be the only institution of the kind in England. Its members number about 400. In *Hull* there has been a C. of C. since 1837, but those of *Liverpool*, *Leeds*, and *Bradford*, notwithstanding the great trading and manufacturing interests of these towns, were not established till 1850, in which year, strangely enough, a similar institution was established in *s. Australia*. The *Liverpool* C. of C. numbers nearly 600. The annual income of the *Manchester* chamber is upwards of £800, that of *Liverpool* about £800, contributed entirely by the subscriptions of members, amounting generally to £1 *ls.* a year. There are now chambers of commerce in all the great mercantile towns of Great Britain and Ireland, and in 1860 there was established an "Association of Chambers of Commerce of the United Kingdom." In *Canada*, there is a Dominion Board of Trade, which consists of the chambers of commerce, or boards of trade, as they are indifferently called, of a dozen important Canadian cities. The Chamber of Commerce of *New York* city is the oldest existing institution of the kind in America, organized in 1768, and incorporated by royal charter Mar. 13, 1770, under the name of *The Corporation of the Chamber of Commerce of the City of New York in America*. When the state government was established the charter was renewed by the legislature. It was composed at first of 24 of the most prominent merchants of the city, who established an exchange which has been ever since kept up, though not recently under control of the body. The objects of the Chamber of Commerce are to encourage and promote commerce, support industry, adjust disputes relative to trade, and procure such laws and regulations as may be found necessary for the benefit of trade in general. The membership is about 800,

including nearly all the leading merchants, financiers, and business men of the city. Several years ago a court of arbitration was established, by which differences between members are adjusted, and much litigation in courts avoided. Meetings are held once a month. In the rooms of the Chamber is a vast collection of commercial statistics, and many portraits of merchants.

**CHAMBERLAIN, DANIEL HENRY**, b. West Brookfield, Mass., 1835; graduated at Yale coll., and at the Harvard law school; entered the union army and served until 1865, principally on staff duty. He settled in Charleston, S. C.; was a member of the state constitutional convention, 1867-68; atty.-gen. 1868-72; and gov. 1874-76. He was inaugurated a second time, but his election was successfully contested, and he relinquished his office, 1877, and removed to New York to practice his profession. He has written for the *North American Review*.

**CHAMBERLAIN, JOSEPH, P.C., M.P.**, English statesman, was born in London in 1836, was educated at University College, and during early life was a manufacturer in Birmingham. His introduction to public life was in 1870; he was thrice elected mayor of Birmingham, and since 1876 has represented that town in parliament. His advocacy of disestablishment, and of compulsory secular education and other radical measures, made him conspicuous, and he was for a time (1886) in Gladstone's cabinet, as president of the local government board, but resigned because of opposition to Gladstone's home-rule measures. He was appointed British commissioner to the conference at Washington for the settlement of the fisheries dispute between the United States and Canada (1888), in that year married Miss Endicott, daughter of the secretary of war under President Cleveland, and became secretary of state for the colonies in the Salisbury ministry in 1895.

**CHAMBERLAIN, LORD**, or King's C., as he was formerly called, has been one of the English officers of state from very early times, and for centuries he was an influential member of the government. He has the function of indorsing the king's answer on petitions presented to him, and very often of communicating his majesty's pleasure to parliament and to the council. He was always a member of the council himself, *ex officio*. Though he has long ceased to have any share in the responsibilities of government, the C. is still an officer of very high standing in the royal household. He has control over all the officers and servants of the royal chambers, except those of the bedchamber, over the establishment attached to the chapel royal, the physicians, surgeons, and apothecaries of the household. The C. has further the oversight of the queen's musicians, comedians, trumpeters, messengers, etc.; and all tradesmen and artificers in her service are appointed by him. When the office of keeper of the great wardrobe was abolished in 1782, the duties of providing the state-robcs of the royal family, the household, and officers of state, devolved on the lord chamberlain. All theaters in towns in which a royal palace is situated, require to be licensed by the Lord C., and no new play can be performed anywhere without his license. All persons desiring to be presented at levees or drawing-rooms, require to send their cards to the Lord C., and it is his duty to see that the persons thus applying are entitled by station and character to be presented to the queen. The C. also issues her majesty's invitations to balls, parties, etc. In accordance with ancient custom, the Lord C. is still a member of the privy council. His salary is £3,000 a year, but his tenure of office depends on that of the political party to which he belongs.

The *Vice-chamberlain* is the deputy and assistant of the Lord C., and in his absence exercises the full authority which belongs to his principal. His office existed in the time of Richard II. He is also dependent on the administration, and is usually a member of the privy council. His salary is £924 per annum.

**CHAMBERLAIN, THE LORD GREAT**, is a hereditary officer of great antiquity, and formerly of great importance. He has the government of the palace at Westminster, and, upon solemn occasions, the keys of Westminster hall and of the court of requests are delivered to him. At these times, the gentleman usher of the black rod, the yeoman usher, and the doorkeepers, are under his orders. At coronations, state-trials, banquets, and the like, the fitting-up of the hall devolves on him. When the queen goes to parliament, he delivers the sword of state to any member of the administration whom he chooses, to be borne before her majesty, he himself walking on her right hand. During the sitting of parliament, he has charge of the house of lords, and issues tickets of admission on the opening or prorogation of parliament. Some fees and perquisites belong to him. This office, conferred by Henry I. on Alberic de Vere, was inherited by female succession from the De Veres, earls of Oxford, by the Berties, and is now held conjointly by lady Willoughby de Eresby and the marquis of Cholmondeley, in right of their mothers, sisters and co-heirs of Robert, fourth duke of Ancaster. They discharge the duties alternately in each succeeding reign, a lady acting by deputy.

**CHAMBERLAIN, JOSHUA LAWRENCE, LL.D.**, b. Me., 1828; a graduate of Bowdoin college. During the civil war he served with distinction, was six times wounded, and left the service with the rank of maj.-gen. From 1866 to 1870, he was governor of Maine, and in 1871 was chosen President of Bowdoin college. When the democrats and fusionists, under the lead of Gov. Garcelon, in 1879-80 undertook to get possession of the state government, and there was some danger of civil war, C. was major-general of the militia of the state. He adhered to the regularly elected legislature, as sustained by the unanimous opinion of the supreme court, and prevented the intended violence and usurpation. He resigned the presidency of Bowdoin college in 1883, and removed to New York to practice.

**CHAMBERLIN**, THOMAS CROWDER, LL.D., geologist; b. Mattoon, Ill., 1843; educated at Beloit college and the University of Michigan; became professor of geology at Beloit; president of the University of Wisconsin 1887-92; dean of the scientific faculty, University of Chicago, 1892. He also became chief geologist of Wisconsin, had charge of the glacial division of the U. S. geological survey, and was author of numerous monographs published by the government.

**CHAMBERS, PRACTICE BEFORE A JUDGE OR VICE-CHANCELLOR AT.** It is to applications to the court *in banc* alone that the name of motions is properly given. But there are certain matters of subordinate importance, regarding which applications are made to a single judge at chambers, who decides in a summary way on the pleadings.

**CHAMBERS**, a co. in e. Alabama, on the Georgia border, intersected by three lines of railroad. Before a division was made to form Lee co., the area was 775 sq. m. It is now 610; pop. '90, 26,319. It is partly bounded by the Chattahoochee river, and is intersected by the Tallapoosa. Productions, cotton, corn, wheat, sweet potatoes, peaches, and timber. Co. seat, Lafayette.

**CHAMBERS**, a co. in s.e. Texas, on the gulf of Mexico, bounded on the w. by Galveston bay, and intersected by Trinity river; 840 sq.m.; pop. '90, 2241, with colored. The surface is mainly prairie; productions, corn, cotton, and sweet potatoes. Co. seat, Wallisville.

**CHAMBERS, EPHRAIM**, the compiler of the first English encyclopædia. He was b. at Kendal in the latter part of the 17th c., and began life as an apprentice to a globe-maker in London, where he conceived the idea of his encyclopædia. The first edition of the work, in 2 vols. folio, appeared in 1728; ten years later, the 2d appeared; and in the year following, the 3d. The 4th was issued in 1741, a year after the editor's death. A 5th appeared in 1746, and a 6th, with new matter, in 1750. This work forms the basis of Dr. Rees's Cyclopædia in 45 quarto vols., and may be considered as the forerunner of the now countless publications of an encyclopædic character (see ENCYCLOPÆDIA).

**CHAMBERS, GEORGE**, 1803-40; an English painter. When a boy he followed the sea, where he made sketches of vessels, which so pleased his master that he canceled the boy's indentures. C. then apprenticed himself to an old woman who kept a paint-shop, and began house-painting. Finally he got employment as assistant in painting the panorama of London for the Colosseum, and then became scene-painter in a theater. His best works are naval battles, such as "The Bombardment of Algiers," and "The Capture of Porto Bello," both in the Greenwich Hospital.

**CHAMBERS, WILLIAM AND ROBERT**, the editors and publishers of the *Encyclopædia* and other works; b. at Peebles, W. in 1800, R. in 1802. Bearing up against the difficulties of his early life, W. C. began business as a bookseller in Edinburgh, 1819; afterwards adding printing to his business. Between 1825 and 1830, he wrote the *Gazetteer of Scotland*, 1 vol.; and the *Book of Scotland*, 1 vol. R. C. also began business as a bookseller in Edinburgh, and from 1823 to 1830 wrote successively the *Traditions of Edinburgh*, 3 vols.; *Popular Rhymes of Scotland*, 1 vol.; *Picture of Scotland*, 2 vols.; and *Histories of Rebellions in Scotland, and Life of James I.*, 5 vols. Next, he edited *Scottish Ballads and Songs*, 3 vols.; and *Biography of Distinguished Scotchmen*, 4 vols. His *Traditions of Edinburgh* procured him the friendship of sir Walter Scott, who contributed various memoranda for the work. W. C. projected *Chambers's Edinburgh Journal*, and that periodical was commenced on the 4th of Feb., 1832, about six weeks in advance of the *Penny Magazine*, and may be considered the pioneer of that class of cheap and popular periodicals of a wholesome kind now so generally diffused. The success of the *Journal* was materially promoted by the essays, moral and humorous, of R. C., who from the first was an able collaborateur. United from this period in the peculiar profession of writing, editing, printing, and publishing, W. and R. C. issued a series of works designed for popular instruction, including the *Journal*. Among these works are *Chambers's Information for the People*, 2 vols.; *Chambers's Educational Course*, 250 vols.; *Cyclopædia of English Literature*, 2 vols.; *Miscellany of Useful and Entertaining Tracts*, 20 vols.; *Papers for the People*, 12 vols.; and the present *Encyclopædia*, 10 vols. In conducting these laborious undertakings they necessarily depended on a number of accomplished literary assistants. In 1849, W. C. acquired the estate of Glenormiston in Peeblesshire, and a few years afterwards he founded and endowed an *Institution* in his native town for purposes of social improvement (see PEEBLES). His later productions are—*Things as they are in America*, 1 vol. (the result of a visit to the United States in 1853); the *Youth's Companion, and Counselor*, 1 vol.; *History of Peeblesshire*, 1 vol. 8vo (1864); pamphlets on *Improved Dwellings and Co-operation among the Working Classes; Wintering at Mentone*, written from personal knowledge of the place during two successive visits; *France: its History and Revolutions*, 1 vol (1871); *Memoir of Robert Chambers, with Autobiographic Reminiscences*; and *Ailie Gilroy*, a story. More lately, *Stories of Remarkable Persons, Stories of Old Families*, and the *Story of St. Giles* (1879). Twice elected lord provost of Edinburgh, W. C. occupied that office for four years (1865-69), during which he promoted several important public acts, including one for the improvement of the older part of the city. R. C. latterly wrote a work on *Ancient Sea Margins*; after which appeared his *Domestic Annals of Scotland*, 3 vols. He also edited the *Life and Works of Robert Burns*, 4

vols. A collection of his historical and miscellaneous papers was issued under the title of *Select Writings of Robert Chambers*, 7 vols. His latest production was the *Book of Days*. In 1868 he received from the university of St. Andrews the honorary distinction of LL.D. R. C. died at St. Andrews, 17th Mar., 1871, leaving a high character for literary application, integrity, and geniality of disposition. In 1872, W. C. received the honorary distinction of LL.D. from the university of Edinburgh. Engaged in miscellaneous literary labor, he continued head of the firm of W. and R. C., which owns an extensive printing and publishing establishment in Edinburgh, and a publishing establishment in London. The whole of the works issued by W. and R. C. aim at popular instruction, free of all political or sectarian bias. William C. died, 1888, and Robert C., eldest son of R. C., conducted the *Journal* until his death in 1888.

**CHAMBERSBURG**, borough and the co. seat of Franklin co., Penn., on Conococheague Creek; 52 miles southwest of Harrisburg. It is finely situated in the broad Cumberland Valley, in the midst of a populous and well-cultivated region, and is a well-built borough. It suffered considerably during the civil war, and in 1864 a large part of the town was burned by the Confederates, under General McCausland, with a loss of more than a million dollars. Chambersburg contains a court house, churches, national banks, an academy, and Wilson College for young women. There are daily and weekly newspapers, manufactories of shoes, furniture, carriages, wool, paper, iron, milling-machinery, and boilers; and the shops of the Cumberland Valley Railroad. Chambersburg is on the Cumberland Valley, the Chambersburg and Gettysburg, and the Western Maryland railroads. Pop. '90, 7868.

**CHAMBERTIN** is a famous vineyard situated near the town of Dijon, the former capital of the old duchy of Burgundy. It covers about sixty acres, and is divided among several proprietors. The annual yield is usually about 800 hogsheads, and it is considered one of the finest of the Burgundy wines.

**CHAMBERY**, a t. of Savoy, of which it is the capital, beautifully situated in a rich vine-clad valley, between two ridges of hills, about 45 m. w.s.w. of Geneva. Though situated at an elevation of nearly 1000 ft. above the sea, the climate of C. is mild; the scenery around, with the river Leysse flowing through the valley, is exceedingly fine. The town itself, however, is dull and uninteresting. Some towers and other fragments of the old castle of the dukes of Savoy still remain. Pop. '91, 20,923.

**CHAMBLY**, a s.w. co. in the province of Quebec, Canada, on the St. Lawrence, opposite Montreal; 190 sq.m.; pop. '91, 11,704. Chief town, Longueuil.

**CHAMBORD**, a very celebrated castle of France, in the department of Loir-et-Cher, situated in the midst of a vast walled park 21 m. in circumference, about 13 m. e. of Blois. Its foundation was laid in 1526, by Francis I., who employed 1800 men constantly in its erection until his death. The work was continued with less zeal by his successors, Henri II., Henri III., Charles IX.; and Louis XIV. and Louis XV. also made some additions to it. The building, which marks the transition between the fortified castle and Italian palace, is surmounted by a vast number of turrets, minarets, and cones; its most prominent features, however, being six enormous round towers, each 60 ft. in diameter. The double spiral staircase in the central tower is of great architectural interest, being so contrived that parties pass up and down without meeting each other. The castle has no less than 440 chambers. C. was the scene of the gallantries of Francis I. Here Henri II., Louis XIII., and Louis XIV. resided; and at one of the brilliant fêtes given at the castle by the latter, Molière performed, for the first time, his play of the *Bourgeois Gentilhomme*. Among the other occupants of C. were marshal Saxe, Stanislaus, king of Poland, and Marshal Berthier, upon whom it was bestowed by Napoleon I. It was bought from Berthier's widow by a number of legitimists, and presented to the duc de Bordeaux, who was hence called comte de C. (q.v.), who presented it to the French nation.

**CHAMBORD** (HENRI CHARLES FERDINAND MARIE DIEUDONNÉ D'ARTOIS, DUC DE BORDEAUX), Comte de, the representative of the elder branch of the house of Bourbon, and of its claims to the French throne, was b. in Paris, Sept. 29, 1820. He was the grandson of Charles X., and the son of the duke of Berri who was murdered by Louvel, Feb. 14, 1820. The duke of Angoulême, Charles X.'s eldest son, being childless, the duke of Berri was heir-presumptive; and as, at his death, he left only a daughter, the joy was great when, seven months after, his widow gave birth to a prince, who received the title of duke of Bordeaux—that of comte de C., by which he was subsequently known, being derived from the castle of C. (q.v.), presented to him at his baptism. He was baptized, amid circumstances of great pomp, with water brought by M. de Châteaubri and from the river Jordan, and received the appellation of *l'enfant du miracle* ("the miraculous child"). When Charles X. abdicated the crown at the revolution in 1830, he did so in favor of his grandson, the duke of Bordeaux. The people, however, insisted on the "citizen king," and the elder Bourbons were banished. On the death of Charles X., the duke of Angoulême assumed the title of Louis XIX., and another party proclaimed the duke of Bordeaux king; but at last a reconciliation was brought about by prince Metternich. In 1839, the prince visited Italy, accompanied by his mother, and



was received by the petty courts with great distinction. After the death of the duke of Angoulême, in 1844, the heads of the different fractions of legitimists met to pay their united homage, and the duke of Bordeaux made a "pilgrimage to Belgrave Square" to receive it. In 1846, he married the eldest daughter of the duke of Modena, who had never acknowledged the monarchy of July. After the revolution of 1848, many legitimists were returned to the national assembly. In 1850, the duke of Bordeaux, or count of C., as he styled himself, appeared at Wiesbaden, where a congress of his adherents assembled to consult as to their future policy. As the count of C. was without heirs, a union, or "fusion," as it is called, of the partisans of the elder Bourbons with the Orleanists was effected, but no attempt made to carry out the arrangement. After the capitulation of Paris in 1871, the count of C. returned to France, and, under the title of Henry V., issued a proclamation, in which he promised, if placed by the nation at the head of its affairs, to maintain the temporal power of the pope. He died, Aug. 24, 1883. His manifestoes never induced the French people to accept him as their king.

**CHAMBORD, MARIE THÉRÈSE BÉATRICE GAËTANE**, Countess de, Archduchess of Austria; b. July 14, 1817; wife of the Bourbon who called himself Henry V. of France, and eldest daughter of Francis IV., duke of Modena. Her sister was the wife of Don Juan de Bourbon, and mother of Don Carlos, duke of Madrid. She won great reputation and respect for her care of sick and wounded French soldiers during the German war. D. 1856.

• **CHAMBRE ARDENTE** ("the fiery chamber"), a name given at different times in France to an extraordinary court of justice, probably on account of the severity of the punishments which it awarded, the most common being that of death by fire. In the year 1535, Francis I. established an inquisitorial tribunal, and a *chambre ardente*. Both were intended for the extirpation of heresy. The former, of which the pope was a corresponding member, searched out, by means of spies, cases of heresy, and instructed the processes; while the latter both pronounced and executed the final judgment. Under Henri II., the activity of the C. A. received a new impulse, the entrance of that monarch into Paris on the 4th July, 1549, being signalized by the burning of several heretics. But Francis himself, gallant and gay, as courtly history represents him, also seemed to relish a spectacle of this kind, for on various occasions he and his mistress presided at a burning. By and by, the C. A. relaxed in its penalties, and a cry was got up among the more bigoted Roman Catholics that it was conniving at heresy. This seems to have roused the "lurking devil" in its members, and, in order to wipe away the reproach, they commenced a series of unheard-of cruelties, which, along with other events, contributed to originate the religious war of 1560. In 1679, Louis XIV. employed it for a new and more praiseworthy purpose—viz. to investigate the numerous reports of poisoning cases which the trial of the Marchioness Brinvilliers (q.v.) caused to be circulated. Many persons of the first rank, such as the *Maréchal de Luxembourg*, and the princess Louise of Savoy, were examined on suspicion, but no one was executed except the pretended sorcerer, Voisin (1680), after whose time the C. A. ended its activity.

**CHAMBRE INTROUVABLE** (Fr. unfindable chamber; i.e., the chamber the like of which is not to be found again) was the name sarcastically given to that chamber of deputies in France which met after the second return of Louis XVIII. (July, 1815), and which, by its fanatical royalty, began to throw the country and society anew into commotion. The former chamber, which had shown much moderation, had been dissolved under the influence of the court party; and the ministry, led by Talleyrand, had done everything to procure for the ruling party at least a manageable chamber adapted for business. The number of the deputies was arbitrarily raised from 259 to 892; and to secure the victory of a complete restoration, all rushed forward who saw in the constitutional charter an encroachment on their privileges and pretensions. When it is considered, in addition, that the elections, at least in the departments of the south, took place under terror and the sanguinary outrages of a populace in a state of political and religious excitement, that the press was stifled, and the people deprived of all freedom of expression by the foreign armies, ultra-royalism could not fail to be completely triumphant. When the ministers saw this startling result, they did not venture to open the session; they resigned, and gave place to the Richelieu ministry. Then broke out the most frightful excesses in the southern provinces. At the elections in Nîmes (22d Aug.), more than 100 persons were killed by the royalist bands. At last, on 7th Oct., the king opened the chamber, on which he enjoined quietness and moderation; and it appeared as if it did take this advice to heart for an instant. But when, in one of the first sittings, Boyer d'Argenson asked for the intervention of the chamber in behalf of the Protestants, who were being slaughtered in the south by the ultra-royalist bands, the speaker was called to order, and the chamber from that time ceased to observe any bounds or moderation. The fanatical legislation of this chamber inspired the ministers, the king, and especially the emperor Alexander, with so much aversion and apprehension, and also met so decidedly with the disapprobation of all peaceful and sincere friends of the throne, that the news of its dissolution, on 5th April, 1816, was received with universal rejoicing. The electoral law of 5th Feb., 1817, prevented the return of a similar chamber; and it was not till by the modified electoral law of 1820 that ultra-royalism regained a predominating influence in parliament. It is said that Louis XVIII. first

used the epithet *chambre introuvable* in an ironical sense, and that the majority of the chamber took it seriously as a compliment.

**CHAMBURE**, AUGUSTE LEPELLETIER DE, 1789-1833; a French soldier, whose daring at Dantzic in 1813, and in other places during Napoleon's wars, earned for him the name of "the devil." He was a prisoner for a time, but was released, and restored to military command in France. After Louis Philippe came to the throne, C. became one of the staff of Soult, minister of war.

**CHAMELEON**, a southern constellation within the antarctic polar circle, and containing nine stars.

**CHAMELEON**, *Chamaleo*, a genus of saurian reptiles, constituting a distinct family, of very peculiar form and structure, and on various accounts highly interesting. The body is much compressed; the dorsal line sharp, in some of the species rising into an elevated crest; the back of the head is also elevated into a sort of cone. The neck is very short, and does not admit of the head being turned, for which, however, compensation is found in the remarkable powers of motion possessed by the large prominent eyes, which move independently of one another, and are covered with a membrane pierced only with a small hole for the pupil to look through. There are no external ears. The skin is not covered with scales, but, like shagreen, rough with granules. The legs raise the body rather higher than in most of the saurians; the toes, both of the fore and hind feet, are divided into two sets, one directed forward, and the other backward, so that each foot has the power of grasping like a hand. The tail is long and prehensile. The lungs are very large, and are connected with air-cells that lie among the muscles and beneath the skin, so that the animal has a remarkable power of inflating itself with air. The tongue is remarkably extensible, and is the organ by which the animal seizes the insects which constitute its food, being darted at them with unerring aim, whilst a viscous saliva causes them to adhere to it, and they are carried with it into the mouth. Chameleons are slow in their movements, except those of the eyes and tongue, and remain long fixed in one spot, awaiting the approach of insects, which they seize on their coming within reach. They all live among the branches of trees. Their power of fasting is great, and along with their gulping of air in respiration, and their habit of inflating themselves with air, gave rise to the fable, current among the ancients and until recent times, of their living on air. Their celebrated power of changing color is not equally fabulous, and perhaps it would be rash in the present state of knowledge on the subject to assert how far it has been exaggerated. It is probably in part under the control of volition, and may be used, as has been asserted, to render the animal less easy of observation, by assimilating it to the color of surrounding objects; it may depend in part on the action of light; it is certainly connected with the fear and other passions of the creature. Milne Edwards has discovered that it depends upon the presence of two differently colored layers of pigment in the skin.

Chameleons are natives of the warm parts of the old world, but are most abundant in Africa. One species is found in some parts of the s. of Europe, as near Cadiz. The whole number of known species is small.

The fables which, in former times, were current regarding the C. were extremely numerous and ridiculous. It supplied not a few of those medicines to which absurd credulity ascribed the most marvelous powers. See *illus., REPTILES, ETC., vol. XII., fig. 6.*

**CHAMFERING**. In architecture, an angle which is slightly pared off, is said to be chamfered. The chamfer is sometimes made slightly concave, in which case it is called a *hollow* chamfer. Chamfers, in Gothic architecture, have frequently ornamental terminations of various kinds. The term C. is applied to wood-work as well as stone.

**CHAMFORT**, SÉBASTIEN ROCH-NICOLAS, 1741-94; one of the most remarkable and among the first of French bohemians, or brilliant but thriftless authors. He was the illegitimate son of a strolling actress, and never knew his father. Starting in life with only the name "Nicolas," he found his way to Paris, got into the collège des Gracins, worked hard, and won nine prizes out of ten in two years. Much disgusted with the Latin hexameters that crowned his college reputation, he considered the time wasted which he had spent over them, summarizing his opinion in the contemptuous epigram, "What I have learned by study, I do not know; the little I do know I have guessed." He assumed the name of C., and began writing for the press. Being repelled alike by booksellers and editors, he took to writing sermons at a louis each for lazy or incompetent priests. Having successfully competed for one of the academy prizes, the salons of the upper world were opened to him, and he became fashionable. He went on with alternate success and failure, always poor, and living for the most part upon eleemosynary dinners and suppers, repaying countenance and sustenance with his always brilliant but cynical and sarcastic conversation. He was entertained at Sèvres for some years by Mme. Helvetius, and Chabanon gave him his pension of 1200 livres in the *Mercure de France*. C. also took two more academy prizes, won a hundred livres from Necker, and obtained an enormous reputation. He wrote little and talked much; his reputation increased, and finally, under the protection of the duchesse de Grammont, he went to court, where the prince de Condé made him his secretary. He was now

about 40 years old, and fast growing misanthropic. He resigned his secretaryship and retired into solitude at Auteuil, where he fell in love and married a lady attached to the household of the duchesse de Maine. She was a clever, amusing woman of the world; but in six months she left C. a widower. Then he traveled in Holland, where he lived awhile with M. de Narbonne. Then, returning to Paris, he received the chair in the academy left vacant by the death of Sainte Pelaye in 1781. He haunted the court and made himself loved in spite of his withering and uncontrollable irony; but in consequence of an unfortunate love affair he left the court and was received into the house of M. de Vaudreuil; about which time he made the acquaintance of Mirabeau, whom he assisted with orations, and whom he followed heart and soul into the storm and tumult of the revolution. He forgot his old friends; he frequented the clubs, and was for a time secretary of that of the Jacobins; he became a street orator; was among the first of the storming party to enter the Bastille; and worked for a royalist journal in which he depreciated kingships. With the fall of the Girondins his political life came to an end; but he could not restrain the tongue that had made him famous: he no more spared the convention than he had spared the court. This rashness was the cause of his arrest, and he was threatened with a second arrest, whereupon he attempted suicide with pistol and poignard; and, shockingly hacked and shattered, dictated to those who came to arrest him the well-known declaration: "I, Sebastien Roch-Nicolas Chamfort, declare that I would sooner suffer death as a free man than be conducted as a slave to prison." He did not die immediately, but lingered awhile in charge of a gendarme. To the abbé Sieyès he had given fortune in the title of a pamphlet, *What is the Third Estate? Everything. What has it? Nothing.* And to Sieyès also he spoke the famous sarcasm: "At last I am about to leave the world, where the heart must be broken or be changed to brass." As a writer, C. left little of value. It was as a conversationist, and especially for his epigrammatic wit and cynicism, that he won a world-wide fame.

**CHAMIER, FREDERIC**, an English novelist, was b. in London, 1796. He entered the navy as a midshipman in 1809, and distinguished himself in the American war. He left the service in 1833. The success of Marryat in depicting sea-life led C. to try the same field, in which he was not without success, though in invention and humor he falls short of his model. His best romances are—*Life of a Sailor* (8 vols., Lond. 1834); *Ben Brace* (8 vols., Lond. 1835); *The Arethusa* (8 vols., Lond. 1836); *Treavor Hastings* (8 vols., 1841); *Passion and Principle* (8 vols., 1843); *Tom Bowline* (8 vols., 1839); *Jack Adams* (8 vols., 1838), etc. All his novels have been translated into German. C. wrote a *Review of the French Revolution of 1848* (Lond. 1849), in which he gives a rather prejudiced view of some of the prominent actors. He died on the 1st of Nov., 1870.

**CHAMISSE, ADELBERT VON**, one of the most celebrated of German lyric poets, was b. in 1781, at the castle of Boncourt, in Champagne. His parents settling in Prussia in 1790, he became a page of the queen, and entered upon a military career. But when the campaign of 1806 broke out, he returned to France, for though no admirer of Napoleon, he was unwilling to fight against his native land. At this time, he was thrown into the circle of Madame de Staël at Coppet, and there began that study of natural philosophy which he afterwards pursued at Berlin. In 1814, count Rumjanzow, chancellor of the Russian empire, prepared an exploring expedition round the world at his own expense; C. accompanied it as naturalist. He embarked at Cronstadt under capt. Otto von Kotzebue, chief of the expedition, which, however, failed in its main object—that of discovering a north-east passage. Subsequently, he obtained a situation in the botanical garden of Berlin, was made a member of the academy of science; and after a happy domestic life, died there in 1838, universally loved and honored. He wrote several works on natural history, but his fame rests chiefly on his poetical productions. As early as 1804-1806, he, together with Varnhagen von Ense, published a *Musen Almanach*. In 1813, he wrote his original and amusing fiction called *Peter Schlemihl*, the story of the man who loses his shadow, which has been translated into almost all the languages of Europe. The character of his poetry is wild and gloomy, and he is fond of rugged and horrible subjects. In his political songs, he succeeds well in humor and irony; nor is he deficient in deep and genuine feeling. Indeed, several of his ballads and romances are masterpieces in their way. We may instance one of his longest poems, *Salas y Gomez*, written in terza rima, as a proof how peculiarly German the cast of C.'s mind was, despite his French origin. His collected works, in six volumes, appeared at Leipzig in 1836-39.

**CHAMOIS**, *Antelope rupicapra*, Ger. *gemse*, a species of antelope (q. v.) inhabiting the Alps and other high mountains of central and southern Europe, as the Pyrenees, the Carpathians, and the mountains of Greece; also those of some of the Mediterranean islands, Caucasus, Taurus, and other mountains of the w. of Asia. It is one of the antelopes sometimes designated *capriform* or goatlike, because of their departure from the typical or true antelope form, and approach to that of the goats. The C. is about the size of a large goat, but the neck is longer in proportion, and the body shorter; the horns seldom more than 6 or 7 in. long, black, rising nearly straight up from the forehead, and so bent back at the tip as to form a hook. The color is brown, deeper in winter than in summer; the tail is black; the head is of a pale-yellow color, with a dark-brown band along each cheek.

The usual summer resort of the C. is in the higher regions of the mountains which it

inhabits, not far from the snow-line, and it is often to be seen lying on the snow. In winter it descends to the higher forests. The aromatic and bitter plants of the mountain-pastures are its favorite food. It is—like the ruminants generally—very fond of salt; “and many stones are met with in the Alps, hollowed out by the continual licking of the C., on account of the saltpeter with which they abound.” It is gregarious: flocks of 100 are sometimes seen; but in the Swiss Alps, where the numbers have been much reduced by hunting, the flocks are generally very small, and often consist only of a few individuals. Old males often live solitarily. The C. produces one or two young at a birth, in the month of March or April.

It is an animal of extraordinary agility, and flocks may often be observed sporting in a remarkable manner among the rocky heights. It can leap over ravines of 16 to 18 ft. wide; a wall of 14 ft. high presents no obstacle to it; and it passes readily up or down precipices which almost no other quadruped could attempt. It is said to descend obliquely almost perpendicular precipices of more than 20 ft., striking its feet once or twice against the rock, as if to stay and guide its descent, and alighting securely, often on a very narrow ridge of rock, with its hind feet first, and bringing the forefeet almost into contact with them.

The hunting of the C. is an occupation attended with great hardships and much danger, but of which, nevertheless, some of the Swiss peasants become passionately fond. The hunter sometimes goes out on the adventurous chase alone; but more frequently several go out together, dividing into parties; and whilst the flock of C. flee from those whose approach they first descry, an opportunity of using the rifle is obtained by their comrades. The scent of the C. is extremely keen; and when by this sense it is apprised of the approach of the hunter, it becomes alarmed and restless until it sees him, upon which it rushes hastily in an opposite direction, and so falls into the ambushade. When a flock of C. is feeding, one is always on the watch, and by a sort of whistle, announces apprehended danger.—The flesh of the C. is highly esteemed. Its skin is made into leather, and from it the original *shammoy*, or *shammy* leather, so much prized for softness and warmth, was obtained, although the name has now become common also to leather prepared from the skins of other animals. See LEATHER.—When taken young, the C. is easily tamed.—The C. of the Persian mountains is smaller. See *illus., ANTELOPES, ETC., vol. I.*

**CHAMOMILE**, or **CAMOMILE**, *Anthemis*, a genus of plants of the natural order *compositæ*, sub-order *corymbifera*, distinguished by imbricated bracts, a scaly conical receptacle, a ray of one row of female florets, those of the disk hermaphrodite, the achænia obscurely four-cornered, and destitute of pappus. The species are annual and perennial herbaceous plants, chiefly natives of Europe and other temperate parts of the world. Several are found in Britain, amongst which is the **COMMON C.** (*A. nobilis*), the most important species of the genus, well known for its medicinal virtues, a perennial plant with a stem about a foot long, procumbent and much branched, each branch terminated by a flower (head of flowers) more than an inch broad, with yellow disk and white ray, the whole plant intensely bitter and highly aromatic. Its medicinal virtues are ascribed to the essential oil which it contains, *oil of chamomile*, which abounds most of all in the involucre. This oil is of a greenish-yellow color, and is used in the preparation of some medicines. The dried flowers are often administered in the form of an infusion, as a stimulant of the nerves of the abdomen, an alterative and antispasmodic; or are applied to the skin as an anodyne, and on account of their power of promoting absorption and suppuration. The infusion also acts as an emetic, and is often used to assist the action of other emetics. C. flowers find a place in the pharmacopœia, and are also amongst the most esteemed of domestic medicines, the plant being extensively cultivated for their sake, and very generally finding a place even in cottage-gardens. Yet they ought to be used with caution, as they have been known to produce congestion in the brain, and are very apt to aggravate any malady of this kind already existing. A double-flowering variety of C. is more generally cultivated than the single, to supply the C. flowers of the shops, the flowers being whiter and more bulky, but it is otherwise rather inferior. C. is easily propagated by parting the roots. It delights in a dry and rather poor soil.—The name **WILD C.** is given to a very similar plant, also a native of Britain (*matricaria chamomilla*), an annual belonging to a genus closely allied to *anthemis*. It may readily be distinguished by the want of scales on the receptacle. Its medicinal virtues resemble those of common C., and although now disused in Britain, it is in some parts of Europe preferred for internal use, because it is less bitter, less nauseous, and generally milder and more agreeable in its operation.—No small quantity of common C. is illegally used in the manufacture of beer in England, and is imported from Germany for this purpose. Yet this plant is so abundant in some parts of the s. of England as to form a principal part of the pasture in sheep-walks, and to fill the whole air with its scent. The other British species of C. (*anthemis*) are mere weeds; one of them, called stinking C. (*A. cotula*), is so acrid as to blister the fingers, if much handled. But the flowers of the **Ox-EYE C.**, or **DYER'S C.** (*A. tinctoria*), a native of many parts of the continent of Europe, yield a beautiful yellow dye, on account of which the plant is often cultivated.

**CHAMOND**, St., a t. of France, in the department of Loire, situated at the confluence of the Gier and the Ban, about 7 m. n.e. of St. Etienne, on the railway between that

place and Lyons. It is a flourishing well-built town, with extensive manufactures of ribbons and stay-laces. C. has also several silk-mills and numerous iron furnaces and foundries; and extensive coal-mines exist in the vicinity. Pop. '91, 14,668.

**CHAMORERIL**, a lake of Ladakh or Middle Thibet, in lat. 32° 55' n., and long. 78° 15' e. It lies at a height of 15,000 ft. above the sea, on the plateau between the upper waters of the Sutlej and of the Indus, girt by mountains which rise, at some points, 8,000 ft. above its own level. Though it is beyond the recognized limits of perpetual congelation, yet it freezes only in winter, and is hence supposed to be of great depth. Necessarily receiving much water from the surrounding mountains, it is without any visible outlet—evaporation alone, even at this elevation, appearing to maintain one uniform surface on a length of 15 m., and a width of 2½.

**CHAMOUNI**, or **CHAMONIX** (Lat. *Champus mautius*), is the name of a wild and romantic valley and village among the Alps in Savoy. It lies at a distance from all the high-roads, at an elevation of about 8,400 ft. above the level of the sea, and more than 2,000 ft. above that of the lake of Geneva. The valley is about 18 m. long, and about 2 broad, and is traversed by the Arve. It is bounded at the e. end by the Col de Balme, over which there is a mule-path to Martigny, in the upper valley of the Rhone, and from the other end issues the road to Geneva, which lies at a distance of 53½ m. from Chamouni. On the n. side lies Mont Breven and the chain of the Aiguilles Rouges, and on the s., the giant group of Mont Blanc, from which enormous glaciers or rivers of ice slide down, even in summer, almost to the bottom of the valley. The chief of these glaciers are the Glacier des Bossons, des Bois, d'Argentière, and du Tour. By ascending to a point called Montanvert, we come upon the upper course of a glacier, where it expands into a great mountain-lake of ice called the Mer de Glace, in which there is a solitary rock or oasis called Le Jardin, about seven acres in extent, and covered with the most beautiful herbage. The excursion to the Jardin is one of the most striking excursions within the range of Chamouni. Until 1741, the valley was almost unknown; the region was considered a wilderness, and known by the name of Les Montagnes Maudites, or "accursed mountains." In the above year, it was visited by two Englishmen, Pocock and Wyndham, who ascended as far as Montanvert; and a granite block there still bears the name of the Englishmen's Stone. It was only, however, in 1776, that the attention of travelers was effectually called to it by Saussure and Bourrit. The valley is rich in peculiar plants, and furnishes an aromatic and perfectly white honey. The village of C. owes its origin to the Benedictine convent founded between 1088 and 1099. The pop. of the village is about 2,400, who depend partly upon the strangers who visit the valley, and partly upon the pastures and upon hunting. There are several good hotels, and the best guides are to be found here for the neighboring Alps. It is from C. that Mont Blanc is usually ascended.

**CHAMPAC**, *Michelia champaca*, an Indian tree, possessing great beauty both of foliage and flowers, and much venerated both by Brahmanists and Buddhists. Images of Buddha are made of its wood. Its flowers have a pale-yellow tint, and a sweet oppressive perfume, much celebrated in the poetry of the Hindus.

**CHAMPAGNE**, formerly a province of France, now forming the departments of Seine-et-Marne, Aube, Yonne, Haute-Saone, and Ardennes. The province was about 180 m. long by 150 broad, its surface presenting extensive plains with ranges of hills, especially in the north and east. Upon these hills is grown the famous Champagne wine.

In ancient times, C. was known as a part of Gallia, was subjugated by Cesar, and afterwards was annexed to the kingdom established by the Franks. After the 11th c., it had its own dukes, who were vassals of the French kings. By the marriage of Philippe IV. with Joanna, heiress to the kingdom of Navarre, Champagne, Brie, C., in 1284, came to the French crown, and was incorporated by Philippe VI., in 1328. During the campaign of 1792, the eastern part, and, in the campaign of 1814, the western part, of C. was the chief arena of warfare.

**CHAMPAGNE**, or **CHAMPAIGNE**, PHILIPPE DE, 1602-74; a painter of Brussels, born of a poor family. He was a pupil of Fouquier, and in 1621 was employed with Nicholas Poussin to paint in the Luxemburg Palace. His best work is in Vincennes, and in the Carmelite church in Paris, where may be seen his celebrated crucifix. He became first painter to the queen of France, and rector of the Paris Academy.

**CHAMPAGNE WINE** is the produce of vineyards in the above-mentioned province of Champagne. There are white and red champagnes; the white is either sparkling or still. Sparkling or effervescent (*mousseux*) C. is the result of a peculiar treatment during fermentation. In Dec., the wine is racked off, and fined with isinglass, and in Mar. it is bottled and tightly corked. The fermentation being incomplete when the wine is bottled, the carbonic acid gas generated in a confined space dissolves in the wine, and communicates the sparkling property to champagne. To clear the wine of sediment, the bottles are first placed in a sloping position with the necks downward, so that the sediment may be deposited in the necks of the bottles. When this sediment has been poured off, some portion of a *liqueur* (a solution of sugar-candy in cognac) is added to the wine, and every bottle is filled up with bright clarified wine, and securely

re-corked. The effervescence of the wine thus prepared bursts many bottles, in some cases 10 per cent; and in seasons of early and sudden heat, as many as 20 and 25 per cent have been burst. Wine-buyers estimate the value of wine according to the breakage, that which breaks most bottles being considered best. Still or non-effervescent C. is first raked off in the Mar. after the vintage. Creaming or slightly effervescent C. (*demi-mousseux*) has more alcohol, but less carbonic acid gas than sparkling champagne.

The best varieties of this wine are produced at Rheims and Epernay, and generally on a chalky soil. Among white Champagnes of the first class, the best are those of Sillery, which are of a fine amber hue, dry spirituous, and possessing a superior *bouquet*; those of Ay and Mareuil are less spirituous, but are sparkling, with a pleasant bouquet. Other white wines of first class are those of Hautvilliers, Dizy, Epernay, and Pierry.

In the first class of red C., or Montagne, we have the varieties of Verry, Verzenay, Mailly, Mt. Basle, Bouzy, and Thierry; all having fine color, clearness, good body, sufficient spirit, and a pleasant *bouquet*. The trade in Champagne wines is chiefly carried on in Rheims, Aÿ, Epernay, and Chalons-sur-Marne. The cellars in which the vintages are stored are cut out of the calcareous rock. The fact that the sale of C. is very extensive and lucrative, has naturally given rise to adulterations. Sugar, and the juices of pears or gooseberries, or birch-juice, etc., have been used for making spurious Champagne. It may fairly be reckoned that not even a third part of the wine sold for C. in Paris is genuine. The greater part of it is readily manufactured by simply charging other light wines with carbonic acid gas. Recently, the German purveyors have succeeded in preparing light wines—such as Rhenish, Main, Neckar, Meissner, and Naumburg—so much like genuine C., as to deceive even the connoisseur. Altogether, it is estimated that the district produces 1,100,000 hectolitres (24,200,000 gallons) of genuine C., of which, however, the finest growths make but a small part.

**CHAMPAIGN**, a co. in e. Illinois, intersected by the Wabash, the Illinois Central, and the Cleveland, Cincinnati, Chicago, and St. Louis railroads; 1000 sq. m.; pop. '90, 42,159. The surface is level, and the chief productions are corn, broom-corn, oats, potatoes, wheat, hay, cheese, butter, wool, and sorghum molasses. Co. seat, Urbana.

**CHAMPAIGN**, a co. in w. Ohio, intersected by Mad river, and by the Cleveland, Cincinnati, Chicago and St. Louis, the Erie, and the Pittsburg, Cincinnati, Chicago and St. Louis railroads; 447 sq. m.; pop. '90, 26,980. The chief productions are corn, wheat, oats, potatoes, hay, butter, and wool. Co. seat, Urbana.

**CHAMPAIGN**, a city in Champaign co. Ill., on the Illinois Central, the Cleveland, Cincinnati, Chicago and St. Louis and the Wabash railroads, 48 miles s.e. of Bloomington; 128 miles s.s.w. of Chicago. Champaign is a handsome and growing place. The city contains churches, high school, public library, the State laboratory of natural history, model waterworks, daily and weekly newspapers, and national banks, and has electric lights and electric street railroads. It is the seat of Illinois University, which was founded in 1868, and endowed by a grant of land. There are several parks in the city; a fine one, containing ten acres, is an attractive feature of the residential quarter. There are numerous manufactories of furniture, wagons, twine and cordage. Pop. '90, 5839.

**CHAMPARAN**, a district in India, in the Behar province, under the jurisdiction of the lieutenant-governor of Bengal; 26° and 28° n., and 84° and 86° e. The district is a vast level except in the n. and n.w., where it is undulating and rugged as it nears the mountains of Nepal. The s. and w. portions are well cultivated, and have a dense population. There are only two towns of consequence, Bettiah and Motihari. Pop. '91, 1,859,000.

**CHAMPARTY**, or **CHAMPERTY** (Fr., from Lat. *campi partitio*, a division of lands), an offense known to the law of England, which consists in a bargain between the plaintiff or defendant in a suit, and a third party, generally a lawyer, that the latter shall have part of the land, debt, or other thing sued for, in the event of success, and that in the meantime he shall carry on the suit at his own expense. This practice has been strictly forbidden by statute in England from very early times (8 Edward I. c. 25; 13 Edward I. c. 49; etc.); and in Scotland the rule of the civil law by which the *pacum de quodlibet litis* was held to be a *pacum illicitum* (q.v.), and as such void, has all along been part of the common law. Such practices were also forbidden by statute to members of the college of justice (1594, c. 216). There is this difference between the laws of the two countries, however, that whereas in England the offense has always been punished criminally, in Scotland the only penalty which it entails beyond nullity of the bargain, is deprivation of office. In former times, the evil chiefly apprehended from C. probably was, that the honesty of judges might be tampered with by advocates who were generally their friends, and not unfrequently their very near relatives, if permitted to be personally interested in the issue of the causes in which they were professionally employed. In our own day, the chief danger consists in the encouragement which might thus be given to dishonest and oppressive litigation, and the facilities which would be afforded for nefarious transactions between the agents on the opposite sides. That practices closely analogous to C., though unnamed, are not unknown in the lower strata of the legal profession in all countries, is but too probable. The necessities of

trade have further introduced considerable equitable modifications into the law of C., which will be explained under CHOSE IN ACTION. See BARRATRY.

**CHAMP DE MAI.** See CHAMP DE MARS.

**CHAMP DE MARS**, originally CHAMP DE MAI, the title given to annual meetings of the Franks of Gaul in the 5th c. and later. They were national assemblies in which the chief men gathered to pay obeisance to their chief; or were special meetings called by the king, to deliberate upon important matters; or military reviews. One of the Carolingians changed the time of regular meeting from Mar. to May, whence the name. The Romans called them *plactia*.

**CHAMP DE MARS**, a great parallelogram in the environs of Paris, between the Seine and the Ecole Militaire, used especially for military purposes and drills. It is 1098 yards long and 537 wide, with four rows of trees on either side, flanked by ditches, and entered by five gates. It has been the site of many remarkable political and other demonstrations, from that against the legislative assembly in 1791, to the more peaceful universal expositions of 1867, 1878, and 1889.

**CHAMPE, JOHN**, 1752-98; a soldier in the revolutionary army, who was sent as a spy to New York with a view to carry off Arnold, who, after the discovery of his treason, had taken refuge in the British lines. C. discovered that Arnold was in the habit of walking in his garden at a late hour every night, and arranged to seize and hurry him to a boat and across the Hudson; but on the appointed night Arnold had changed his head-quarters and failed to appear. C. immediately escaped and rejoined the patriot army, but he was at once honorably discharged from service, lest if taken prisoner he should be summarily hanged as a spy.

**CHAMPFLEURY** (real name JULES FLEURY), b. 1821. Beginning as a clerk with a Parisian book-publisher, he speedily acquired reputation by such books as *Confessions of Sylvius*; *Adventures of Mariette*; *Stories of Winter, Spring, and Autumn*; and a number of pantomimes. He was one of the founders of *L'Evenement* newspaper; and an author of *Les Oies du Noël* for Proudhon's *Voice of the People*. A satire on country life, *Les Bourgeois de Molinchart*, added to his fame. His works have been published with illustrations, including the *History of Ancient and Modern Caricature*. He d. in 1889.

**CHAMPION** (from a Gothic root signifying to contend, fight; Ang.-Sax. *camp*, fight). In the judicial combats of the middle ages, it was allowed to women, children, and aged persons, except in cases of high treason or of parricide, to appear in the lists by a representative. Such a hired combatant was called a champion. Those who followed this profession were generally of the lowest class, and were held disreputable; for besides the perils of the combat, they were liable to be executed as well as their clients. They were obliged to wear a peculiar dress of leather, and peculiar armor, which was also held disreputable. They were not allowed to fight on horseback, and appeared in the lists with their hair and nails cut short. Champions are mentioned as early as in the time of Charlemagne; and Otto I. employed them in deciding the succession to the empire. At a later period, in the age of chivalry, the word C. came to have a more dignified acceptation, and signified a knight who entered the lists on behalf of an injured lady, of a child, or of any one incapable of self-defense. In England, the crown even had its C., who, mounted on horseback and armed to the teeth, challenged, at every coronation at Westminster, all who should deny the king to be the lawful sovereign of the three realms. This practice is understood to have been first introduced under Richard II., and it continues to make a part of the ceremonial of an English coronation to this day. The name of C. was also given to the knight who, during a tournament, had charge to see that no injury or insult should be offered to the assembled ladies.

**CHAMPION HILLS**, in Hinds co., Miss., where, May 16, 1863, a confederate force under Gen. Pemberton had a short fight with Gen. Grant's forces, then marching upon Vicksburg. The confederates were beaten and forced to retreat to Big Black River.

**CHAMPLAIN, LAKE**, separating the states of New York and Vermont, and penetrating, at its n. end, about 6 m. into Lower Canada. It empties itself into the St. Lawrence, about 45 m. below Montreal, by the Sorel or Richelieu. It is navigable throughout for vessels of about 100 tons, having its communications improved by one canal on its own river, and by another to the Hudson. It stretches in lat. from 43° 30' to 45° 6' n., and in long. from 73° to 73° 30' w., its length being 126 miles; its extreme breadth, however, never exceeds fifteen miles. It abounds in deep bays, and bold promontories, and contains about fifty islands, the largest of which are North and South Hero and Isle La Motte. The views obtained of the Adirondacks and the Green mountains are magnificent. Its principal towns are Whitehall at the s., Plattsburg on the w., and Burlington on the east. This lake, discovered in 1609 by Samuel Champlain, and its tributary, lake George, have been prominent in the history of the country—during the rivalry of France and England before the conquest of 1759-60; during the revolutionary struggle of 1775-82; and lastly, during the war of 1812-14, between Great Britain and the United States.

**CHAMPLAIN**, a co. in the province of Quebec, Canada, bordering on the n.w. bank of the St. Lawrence, about midway between Montreal and Quebec; 229 sq. m.; pop. '91,

20,267. It is intersected by the St. Maurice and other rivers. The soil is fertile, and there is abundance of good timber. Besides ordinary agricultural crops, tobacco and maple sugar are raised. Chief town, Batiscan.

**CHAMPLAIN**, a town in Clinton co., N. Y., on the Canada border, forming the extreme n.e. point of the state, and on the Central Vermont and other railroads. The town contains the villages of Champlain and Rouse Point. It has manufactures of iron, agricultural implements, etc. Pop. '90, town 5207, village 1275.

**CHAMPLAIN**, SAMUEL DE, 1567-1635; the son of a sea captain, and when young in the army of Henry IV. of France. He accompanied the Spanish fleet to the West Indies, and on his return wrote an account of the voyage. In 1603, he was sent to Canada by De Chaste, on whom the king had bestowed some of the new territory. From 1604 to 1607 he was engaged in exploring the coasts and seeking a desirable place for a settlement. The next year he made a third voyage, and began a settlement at Quebec. After many misfortunes and struggles, the settlement became prosperous. In 1629 it was captured by some English adventurers, and C. was taken to London, but was set at liberty in 1632. The next year he returned to Canada, and died there.

**CHAMPLIN**, JAMES TIFT, D.D., b. Conn., 1811; a graduate of Brown university, and tutor therein; from 1838-41 pastor of a Baptist church in Portland, Me.; 1841-57, professor of ancient languages in Waterville college, and from 1857-72, president of the same institution, now known as Colby university. He published a number of college text-books and historical works. He d. in 1882.

**CHAMPLIN**, JOHN DENTON, b. Stonington, Conn., 1834; graduated at Yale coll., 1856. He studied law in Litchfield, Conn., was admitted to the bar there in 1859; in 1862 began literary work; in 1864 was assoc. ed. of Bridgeport (Conn.) *Daily Evening Standard*; 1865-69 was ed. of Litchfield (Conn.) *Sentinel*. He edited *Fox's Mission to Russia* (New York, 1878), and, 1878-77, was one of the corps of editors of Appleton's *American Cyclopædia*; author of *Young Folks' Cyclopædia of Common Things* (New York, 1879), *Young Folks' Cyclopædia of Persons and Places* (1880), *Young Folks' Astronomy* (1881), *Young Folks' History of the War for the Union* (1881), *Chronicles of the Coach* (1886); joint editor with C. C. Perkins of *Cyclopædia of Painters and Painting* (4 vols., N. Y., 1886); with W. F. Apthorp of *Cyclopædia of Music and Musicians* (3 vols., N. Y., 1888).

**CHAMPNEY**, BENJAMIN, b. N. H., 1817; an artist noted for landscape painting of Alpine and White mountain scenery. In early life he was a lithographer in Boston.

**CHAMPNEY**, JAMES WELLS, artist, b. Mass., 1843; learned the business of wood engraving, taught drawing, and studied painting in Europe. He served as a volunteer in the civil war. His wife (Elizabeth Williams) is a popular writer.

**CHAMPOLLION**, JEAN FRANÇOIS, an illustrious name in modern Egyptian archæology, was b. Dec. 23, 1790, at Figeac, in the department of Lot, France. In 1801, he was introduced to Baron Fourier, secretary to the *Institut d'Égypte*, who initiated him into the science of Egyptian antiquities. In 1807, C. went to Paris, in order to pursue, with more advantage, his oriental studies; and, in 1809, was appointed professor of history in the lyceum of Grenoble. In 1811, he published his work, *L'Égypte sous les Pharaons*, intended as the forerunner of a more elaborate work on Egypt, of which only the geographical section appeared, in 1814. In his endeavor to decipher the Rosetta stone, C. labored under the error of supposing that in this inscription the hieroglyphics were wholly ideographic, and the demotic and hieratic characters wholly phonetic. Afterwards, he was led to believe that the hieratic characters were of the same nature as the hieroglyphic, and this conviction he expressed in a communication made to the *Académie des Inscriptions*, in Aug., 1821. In the same year he published his essay, *Sur l'Écriture Hiératique des Anciens Égyptiens* (Grenoble), a work which is now scarce. In this essay he continued to assert the common ideographic nature of both hieroglyphic and hieratic characters. Meanwhile C. had been made acquainted with the conclusions of the acute mathematician, Dr. Thomas Young (q. v.), respecting the phonetic use of hieroglyphic signs. Without doubt, it was this important discovery, of which Dr. Young, however, made no great use, that set C. on the right track of investigation, and led to those brilliant results which were regarded by Niebuhr as constituting the greatest discovery of the century. By a comparison of the name of Ptolemy on the Rosetta stone with that of Cleopatra on the Philænsian obelisk, he was enabled to lay the foundation of an alphabet, which he continued to elaborate until it now forms the basis of modern Egyptian archæology. His first decisive discoveries were made known in his celebrated *Lettre à Mons. Dacier* (Par. 1822), which was followed by the *Précis du Système Hiéroglyphique* (Paris, 1824; second ed. 1828); but his principal work, the *Grammaire Égyptienne*, was posthumously published in 1836.

In 1824, appeared his *Pantheon Égyptien*; and, in 1825, his celebrated letters to the duc de Blacas, in which he explains the names and titles of many of the Pharaohs, written on the monuments in Drovetti's Egyptian collection at Turin, and attempts to class them into dynasties. His theory of interpretation was much controverted at first, but its importance was recognized by such distinguished scholars as Rosellini, Bunsen, sir William Gell, and others.

In 1828, he was appointed by Charles X. to accompany a scientific expedition to



Egypt, of which the results were given by Rosellini in the *Monumenti de l'Egitto et de la Nubie* (Par. 1835-45). On his return to Paris, 1830, C. was made a member of the *Académie des Inscriptions*, etc.; and, in the following year, was appointed to the new chair of Egyptian antiquities in the college of France; but soon after the commencement of his intended course of lectures, in May, 1831, he fell ill, and died, Mar. 4, 1832. According to Silvestre de Sacy, "few men, since the birth of letters, have rendered to erudition services equal to those which have consecrated to immortality the name of Champollion."

**CHAMPOLLION-FIGEAC, JEAN JACQUES**, a distinguished French archaeologist, was b. 1778, at Figeac, in the department of Lot. After holding in Grenoble the offices of librarian and professor of Greek literature, he was appointed, in 1828, conservator of MSS. in the imperial library in Paris; but, after the Feb. revolution, was deposed from office by Carnot. In 1849, he was appointed, by Louis Napoleon, librarian of the palace of Fontainebleau. Besides the *Antiquités de Grenoble* (1807), his chief works include the *Annales des Lagides et Egypte Ancienne* (forming a part of *L'Univers Pittoresque*); *Les Tournois du Roi René*, a splendid work, with lithographs by Motte, and several publications of old French documents. After the death of his younger and more celebrated brother, C. was employed in editing the MSS. left by that distinguished scholar, and has given an account of them in the *Notice sur les Manuscrits Autographes de Champollion le Jeune* (Par. 1842). He died May, 1867.

His son, **AIMÉ CHAMPOLLION-FIGEAC**, 1818-94, followed the same path of historical antiquarianism, and published several interesting and useful works.

**CHANAK-KALESSI** (Turkish, "Pot Castle"), a t. of Anatolia, deriving its name from its manufactures of crockery, is situated on the Dardanelles, about 28 m. s.w. of Gallipoli. Its castle is the most important on the Dardanelles, which name is sometimes given to the town itself. Pop. about 11,100.

**CHANCE**, in its original and strict meaning, may be defined as that which determines the course of events, in the absence of law, ordinary causation, or providence. Strictly speaking, it is an idea which few would now be disposed to admit as corresponding to anything which really exists; the religious mind excluding it as inconsistent with the belief in the divine government, and the philosophical mind rejecting it as inconsistent with a recognition of universal laws of causation. As a word, however, it has always been, and always will be popularly accepted; and its use is correct so far as we overlook, or choose for the moment to throw out of view, the more universal connection of events, and regard them as their emergence, on a superficial view, appears to be determined. The idea of C., as referring to some apparently capricious or at least inexplicable cause of an event, distinguishes it from the word probability, or the degree with which the expectation of an event approves itself to a particular mind, the first expressing what metaphysicians would call an objective, and the second a subjective idea. It is clear that C., being only legitimate as an expression in popular parlance—or if admitted as a term in philosophy, one that would at once lead into the most inextricable problems—is a term which is much too indefinite to admit of any kind of measurement; while what we call probability, or the degree with which an expectation approves itself, owing to certain data presented to the mind, does, as we shall hereafter see, admit of a kind of measurement which leads to very important consequences. For these reasons, the consideration of what is sometimes called the *doctrine of chances*, but what is more properly the *theory of probabilities*, will be found under the head of **PROBABILITY**.

**CHANCEL** (Lat. *cancellus*, a screen). The C., choir, or eastern part of a church, was often separated from the nave by a screen of lattice-work, so as to prevent general access thereto, though not to interrupt either sight or sound. As it was in this part of the C. that the service was always performed previous to the reformation, the clergy were held to have a special right to it, in return for which its repairs in general still fall on the impropriator, rector, or vicar, and not on the parish. The chief pew in the C. belongs to the rector or impropriator, but the disposal of the seats in the church, with this exception, belongs to the ordinary, or, practically, to the churchwardens, to whom the authority of the ordinary is delegated. No monument, moreover, can be set up without the ordinary's consent. The term C. is usually confined to parish churches which have no aisles around the choir, or chapels behind it or around it; and in this case the C. and the choir have the same signification. But in larger churches there are sometimes chancels at the ends of the side aisles, and this whether the choir has the character of a choir in the larger sense, or of a chancel. See **CHURCH**.

**CHANCELLOR** (Lat. *cancellarius*). It is said that the chief notary or scribe of the Roman emperor was called C., either because he was intrusted with the power of obliterating, *cancellum*, or *crossing out* (*cancellare*, to make lattice-work) such expressions in the edicts of the prince as seemed to him to be at variance with the laws, or otherwise erroneous; or because he sat *intra cancellos*, within the lattice-work or railings (*cancelli*) which were erected to protect the emperor from the crowding of the people when he sat in judgment. Neither the title nor the office of C. is at all peculiar to England. The C. of France (chancelier de France), from a very early time, was an officer of state of great power and dignity, under whom several other officers, bearing also the title of C., were employed in the administration of justice and in the defense of the public

order. The C. of France was the constitutional interpreter of the will of the sovereign; his functions being, on the whole, analogous to those exercised by the C. of England. As an instance in the change of the value of money, not more remarkable than many which could be cited in our own country, it may be mentioned that, in 1290, the salary of this high official was six sous a day, with the privilege, to him and his, of eating at the court. When he was at Paris, and ate at his own lodgings, he had 20 sous a day. The office was abolished at the revolution; and though it was restored by the Bourbons, and even under the first Napoleon the higher-sounding title of arch-chancellor was revived, many of the functions of the old C. were transferred to the minister of justice, and have ever since been held by him.

In most of the other countries of Europe there are officers of state who bear this, or analogous titles, though their powers and duties are very various. The chief functionary in the Austrian empire has often been termed C.; and on the reconstitution of the German empire, Prince Bismarck was made "C. of the empire" (*Reichskanzler*). Besides these state-chancellors, there were officers in many other capacities to whom the title was given. Every bishop has his C. in the church of Rome, and there are still law chancellors of cathedrals, dioceses, universities, chancellor of a cathedral, chancellor of a diocese, chancellor of a university.

In our own country the constitutions of some of the United States create this officer and define his power by legislative statute. In New York, the officer was recognized with others of colonial (English) appointment in the first and second constitutions, but in the constitution of 1846 the court of chancery was abolished, and the C. passed out of office. The tendency of late years is to merge the courts of chancery into the superior law courts. Separate chancery or equity courts exist in only a few states; in others the courts of law sit also as courts of equity; in some equity relief is administered under the forms of the common law; and in others still the distinction between law and equity has been formally abolished. The federal courts exercise equity jurisdiction whether the state courts in the district are courts of equity or not.

**CHANCELLOR, LORD.** It is usually said that the existence of the office in England, as in the other states of Europe, is to be ascribed to the influence which the constitution of the Roman empire had on the constitutions of the modern nations. This influence was exercised in no small measure through the medium of the church, the profession of the law being generally exercised by ecclesiastics; and it is for this reason, probably, that the bishop and the king are furnished with officers bearing the same title, and exercising analogous functions. The C. is always the confidential adviser of the sovereign in state affairs. It is for this reason that he has been called the keeper of his conscience, and that in England it is to him that the duty was intrusted of presiding over a court which acted on what were called—by way of contradistinction—equitable considerations. It is in this latter prerogative that the chief distinction exists between the C. and all other judges; for, whilst they are held by the letter of the law, he was at one time supposed to act rather *juxta bonum et æquum*. In certain more special points of view, there is a similarity between the functions of the chancellors in different states. "In all of them he seems to have had the supervision of all charters, letters, and such other public instruments of the crown as were authenticated in the most solemn manner; and therefore, when seals came into use, he had always the custody of the sovereign's great seal."—Stephen's *Commentaries*, vol. iii. p. 398. It is from this last-mentioned circumstance that the office of C., or keeper (q.v.), which, by 5 Elizabeth, c. 18, is declared to be exactly the same, is created without writ or patent, by the mere delivery of the great seal, and that the C., if a baron, takes precedence of every temporal lord not a member of the royal family, and of all bishops except the archbishop of Canterbury. The C. is a privy-councillor by his office, a member of the cabinet, and prolocutor, or speaker of the house of lords, by prescription. Though the form in which his tenure of office is terminated, is by the resumption of the great seal by the sovereign, the C. practically resigns office with the party to which he is attached. He has the appointment of all justices of the peace throughout the kingdom, but this privilege he exercises generally on the recommendation of the lord-lieutenants. But the most important, and, as it now seems, somewhat anomalous branch of his patronage, arises out of his having been originally an ecclesiastic. Though the last bishop who held the office was John Williams, archbishop of York, who was lord keeper from July 10, 1821, to Nov. 1, 1825, the C. still continues to be patron of all the crown livings of the value of £20 per annum, or under (though in 1863 about 300 were sold to augment the incomes of those sold and those retained), and visitor of all hospitals and colleges of the king's foundation. As representing the paternal character of the sovereign, again, the C. is the general guardian of all infants, idiots, and lunatics, and has the supervision of all charitable uses in the kingdom. As regards his judicial patronage, the arrangement is, that the C. appoints in general all the judges of the superior courts, except the two chief-justices, who are nominated by the prime-minister of the day. Of inferior appointments, the latter also has reserved to him the commissioners of bankruptcy and the judges of the county courts. All these functions the C. performs in addition to his extensive duties as the supreme judge of the court of chancery, both as an ordinary court of common law and of record, and as an extraordinary court of equity. Much inconvenience had arisen from the accumulation of duties in the single

person of this high dignity, and various expedients had been devised for lessening the evil. Vice-chancellors had been appointed, and the duties of the master of the rolls had been extended. In 1875, a considerable change was made by consolidating all the vice-chancellors' courts into one division, called the chancery division of the high court. And the C.'s duties in the house of lords as the highest appeal court were lightened in 1876. The proposal of a minister of justice has, however, not yet found favor. The salary of the C. is £10,000 a year, and he has an annuity of £5,000 on his retirement from office. The style of the C., since the union with Scotland, has been lord high chancellor of Great Britain; but he has scarcely any jurisdiction in Scotland, and in Ireland there is a separate C., having powers in most respects the same as those of the C. of Great Britain. To slay the C. is treason under 25 Edward III. c. 2.

**CHANCELLOR OF A CATHEDRAL** is an officer who superintends the arrangements for the celebration of the religious services. His office is quite distinct from that of the

**CHANCELLOR OF A DIOCESE**, who, as vicar-general to the bishop, is an ecclesiastical judge, appointed to assist the bishop in questions of ecclesiastical law, and hold his courts for him. By 37 Henry VIII. c. 17, it is provided that the C. of a diocese may be a layman, whether married or single, provided he be doctor of the civil law, lawfully create and made in some university. By the canons of 1603, he must be a bachelor of law, at the least, or a master of arts. There are certain cases, however, in which the bishop must sit in person. In case of complaint against a clerk in holy orders, for any ecclesiastical offense against the church discipline act (3 and 4 Vict. c. 86), the bishop is to hear the cause, assisted by three assessors; of whom the dean of his cathedral, or one of his archdeacons, or his chancellor, must be one; and a serjeant-at-law, or advocate who has practiced 5 years in the court of the archbishop of the province, or barrister of 7 years' standing, another.

**CHANCELLOR OF THE EXCHEQUER.** See EXCHEQUER.

**CHANCELLOR OF SCOTLAND.** Previous to the union of the two kingdoms in 1707, when the office was abolished, the C. of S. performed functions in many respects analogous to those which belong to the lord high chancellor of Great Britain. He presided in parliament, and was the head of all the courts of judicature; he was the chief counselor of the king, and keeper of the great seal. From the fact of the distinction between law and equity in the English sense never having been recognized in Scotland, the C. had no judicial functions separate from those of the ordinary courts of law, but he had the principal direction of the chancery, the constitution of which is described below. In early times, the C. of S., as of England, was very frequently an ecclesiastic; but the first, Constantine, earl of Fife, in the reign of Alexander I., and the last, the earl of Seafield, who held the office at the union, were both laymen; and many other nobles, earls of Argyle, Angus, Huntly, etc., appear in the lists given in Crawford's *Officers of State*, and Chalmers's *Caledonia*. On the abolition of the office, a keeper of the great seal was appointed, who acts merely ministerially in affixing it to the writs which pass under it. See GREAT SEAL.

**CHANCELLORSVILLE, BATTLE OF**, in Spottsylvania co., Va., between the union army under Gen. Hooker and the confederate forces under Gen. Lee, May 2, 1863. Hooker had succeeded Burnside in command of the army of the Potomac, and after nearly three months' work brought it into a state of efficiency. He had 132,000 men, 13,000 of whom were cavalry. This army, in seven corps, lay on the Rappahannock opposite to Fredericksburg. On the heights on the other (right) bank the confederate army was strongly intrenched; it numbered 62,000 men, of whom about 3,000 were cavalry. Hooker resolved to turn the confederate left flank, first sending nearly all his cavalry to destroy communication with Richmond. April 27th, Hooker sent 36,000 men up the left bank of the river beyond the confederate line, and they crossed safely. The objective point was C. a solitary brick dwelling-house in a wide and barren region. Before sunset, on the 30th, 48,000 union soldiers had reached the place. Another considerable union force had crossed the Rappahannock below Fredericksburg, and were making demonstrations in the confederate front. Lee appears to have been unaware of these movements until the evening of the 30th. At midnight his men were in motion, and before noon of May 1st he was in line of battle in Hooker's front. At daybreak "Stonewall" Jackson, with 30,000 confederates, moved behind the shelter of a dense forest (the "Wilderness"), and at 3 P.M., after a march of 15 m., fell upon the union army while the men were preparing their dinner, with arms stacked and their intrenchments unguarded. The union forces fled without making a stand, and pushed towards C. There they were with difficulty brought to a stand. Jackson, who had pursued them closely, rode out to reconnoiter, when he was fired on by his own men who mistook his escort for a union company. He died on May 10th. Thus far the greatest damage suffered by the federals was the temporary disorganization of Howard's corps, which was the weakest corps in the field; and this was more than supplied by the arrival during the night of a large corps from Fredericksburg. On the morning of May 3d (Sunday), Hooker was still on the defensive. The confederates began the attack, and it was hotly continued until 10 o'clock, both sides suffering severely. While Sickles was bearing the brunt of Stuart's attack, the ammunition

failed, and Sickles sent for aid. At the moment the message came to Hooker, he was struck by a spent ball and fell insensible to the ground; so there was no one to send aid to Sickles, and he was obliged to fall back. The weight of some half-dozen assaults fell upon his division, until he was overpowered and his lines destroyed. The day passed in desultory fighting and strategic movements, in which, on the union side, there was much indecision and loss of opportunity. During Monday night Hooker resolved to abandon his position, and threw up intrenchments to cover his bridges. A storm came on Tuesday afternoon, but during the night the union forces crossed the river, and the battle was over. The losses, as set forth in official reports, were: on the union side, 17,000, of whom 12,000 were killed and wounded and 500 missing; on the side of the confederates about 13,000, of whom 10,800 were killed and wounded and 2,700 missing.

**CHANCELLOR OF A UNIVERSITY.** The highest honorary office connected with a university is generally that of chancellor. See **UNIVERSITY**.

**CHANCE-MEDLEY, AND CHAUD-MEDLEY, OR MELLÉ** (Fr. *chaud*, hot; and *mêlée*, a fray), as it is called in Scotland, are French expressions borrowed by our law. Though often spoken of as synonymous, they are, in reality, distinct in meaning—the one signifying a casual affray; the other, an affray in the heat of blood or passion. Both are in this country, and in most others, recognized as pleas in mitigation of the offense of *homicide* (q.v.). See also **SANCTUARY**.

**CHANCERY** (Lat. *cancellaria*). As the Roman emperors, and after them the various sovereigns who divided the vast inheritance of the empire, had each a chancellor (q.v.), so in every European kingdom there was an establishment called a *C.*, where these officers performed their functions. If we imagine a large chamber divided by lattice-work (*cancelli*), the outer half devoted to the people, the inner occupied by the chancellor and his subordinates, engaged in framing edicts, letters of nobility, and the like, and engrossing them on parchment, and sealing them with the king's own seal in proof of their authenticity, and then handing them through the railings to the people without, we shall have a pretty good conception of the *C.* in its earliest form.

**CHANCERY, COURT OF**, until recently the highest court in England, inferior only to Parliament. Originally a chancery was the office of a secretary or chancellor where official documents were put in form, sealed and dispatched, or filed as records; the derivation of the word is supposed to be from a Latin word meaning lattice-work, referring to the screening off in olden time of such an office. The chancellors originally had a purely ecclesiastical jurisdiction; they assumed first as a matter of conscience and equity a legal authority in law relating to real estate in this way; the passage of the statutes of *mortmain* forbade the gift of land to religious corporations; to avoid this the chancellors devised the plan of having the land granted to a third person to hold to the use of the religious body (see *CERTUI QUE USE*); they then affirmed the use as binding in conscience. In matters not connected with *mortmain* this idea was soon found useful as giving relief from common law difficulties in transferring real estate. Gradually the jurisdiction of the chancellor's court became enlarged until it assumed to provide a remedy wherever the common-law machinery was defective. Equity supplemented the common law by considering the intention rather than the wording of legal principles; it must not be considered, however, as synonymous with natural justice as, like the common law, it depends on established rules and principles; it is, as we have said, supplemental to the latter but not necessarily of superior authority. Thus, it affords a relief in cases of fraud, accident or even mistake in contracts, where the common law could consider only the written instrument; and in some cases an equity or chancery court may set aside or cause to be totally changed an instrument in writing. A large class of cases coming under equity practice is that where an injunction, temporary or permanent, is sought against the doing of some injurious act; here it is evident that the common law was defective in that it would only award damages *after* the act was done. An equity court also can compel the discovery of facts within the knowledge of a defendant, and unlike common law courts, it may and often does afford relief by compelling the specific performance of contract or other legal obligation. The practice of an equity court differs in many respects from one of common law; in the former a subpoena takes the place of the *captas* of the latter; suit begins in equity by a bill of equity or petition; in common law by a declaration. The constitution of the court of chancery in England consisted of the lord high chancellor, the master of the rolls, and three vice-chancellors. From an early date the Court of Chancery obtained an administrative jurisdiction over the affairs of infants, married women, and insane persons when thrown into litigation. Such persons were known as *wards of chancery*, and any interference or exercise of influence over them was punished with great severity. From the anomalous character of the origin and growth of jurisdiction of this court, its procedure and precedents were complicated in the extreme. Well-founded complaint was made of the delays and expense accompanying chancery litigation. One great English authority, Lord Westbury, went so far as to say that England supported one set of tribunals to do injustice and another to remedy it. Charles Dickens satirized in *Bleak House* some of the defects of the system. Shortly after the publication of this novel and, it may be, partly in consequence of it, the procedure was simplified to some extent, but it was increasingly evident that a unifying of the double system of equity and common law was eminently desirable, and

in 1878 an act was passed by which the court of chancery became one division of the high court of justice, retaining its equity jurisdiction but transferring its ordinary jurisdiction to other divisions of the court. This forms an important part of that "fusion of law and equity" under the Judicature Acts, 1873-76, which has so simplified and made orderly the practice of English courts.

In the United States the terms court of chancery and chancery are used in some states as equivalent to courts of equity and equity. The principles and practice of equity were generally transferred to this country as they existed in England; but in most of the states there are not separate courts of chancery, the same judges sitting, according to the nature of the case, either as a common law or equity court. A few states, however, constituted courts of chancery under that name; these were Alabama, Delaware, Florida, Mississippi, New Jersey, Tennessee, and Vermont. As early as 1848 the state of New York not only abolished the distinction between courts of equity and common law, but did away with the old forms of practice in both, substituting, for instance, for the old declaration (at common law) or bill (in equity) and the pleadings which followed, a simple complaint or statement on the part of the plaintiff and answer from the defendant. Many of the states have followed this admirable reform. By the United States Constitution federal courts are especially given jurisdiction in equity as well as in common law cases.

**CHANCERY.** See SYPHILIS.

**CHANDAH**, a t. of India, on the s.w. frontier of the territory of Nagpore, on the left bank of the river Eraee, near its junction with the Wurda, 90 m. s. of the town of Nagpore. Its walls, built of cut stone, and surrounded by a high parapet, are 6 m. round, from 15 to 20 ft. high, and flanked with round towers large enough for the heaviest guns. Within the place, and almost equidistant from the n. and s. faces, is a citadel; the rest of the interior consists of straggling streets, detached houses, and plantations. It is well supplied with water. In 1818, C. was taken by the British. Pop. 17,000. C. is capital of a British administrative district having an area of 10,785 sq. m., and a pop. of 649,146.

**CHANDÂLA**, the lowest of the impure classes in Hindu caste. Besides the four pure classes there are various mixed and more or less impure classes, some of which, the C. for instance, are so vile that their shadow is pollution, and no true Hindu will take shelter under the same roof or tree with them.

**CHANDELEUR ISLANDS**, in the Gulf of Mexico, between the mainland of Mississippi and the mouth of the river. There is a light on the n. end of the most northerly island, in 30° 8' n., and 88° 52' west.

**CHANDERNAGORE**, a French city, with a scanty territory of about 2000 acres, on the right or w. bank of the Hoogly, 21 m. above Calcutta by railway, on the opposite shore, in lat. 23° 50' n., and long. 88° 23' east. The population, estimated at about 30,000, consists of a few Europeans and Eurasians, the great bulk being natives.

**CHANDLER**, CHARLES FREDERICK, PH.D., LL.D., b. Mass., 1836; educated at Harvard, Berlin, and Göttingen. In 1857 he was appointed professor of chemistry in Union college; in 1858, in the New York college of pharmacy; in 1864, in the school of mines of Columbia college; and in 1876, professor of chemistry and medical jurisprudence in the college of physicians and surgeons. He became chemist of the New York board of health in 1865, and president in 1873. In 1897 he resigned the chair of chemistry in the college of physicians and surgeons, and the office of dean of the school of mines of Columbia university in order to devote more time to the chair of chemistry in the university. In 1870, with his brother, he established *The American Chemist*. He is the author of many important scientific papers.

**CHANDLER**, DR. RICHARD, a scholar and antiquary of considerable eminence of the last century, was b. at Elson, in Hampshire, in 1738, and educated at Oxford. He first became known as the editor of the magnificent work, *Marmora Oxoniensia*, published by the Oxford university in 1763. He afterwards traveled through Greece and Asia Minor, with Revett, an architect, and Pars, a painter, at the instance of the then flourishing Dilettanti society, with a view to collect information regarding the former state of these countries, and to procure exact descriptions of the ruins. The result of their united labors appeared in 1769, in 2 vols., entitled *Ionian Antiquities*. C. also published a valuable account of the ancient inscriptions of Asia Minor and Greece; and his account of his travels in these countries, issued in 1766-76, is still a standard work. He also published a *History of Troy*. He died in Feb., 1810.

**CHANDLER**, JOSEPH RIPLEY, 1792-1880; b. Kingston, Mass.; removed to Philadelphia and founded there the *United States Gazette*, which he edited for many years. He was a highly respected citizen, a representative in congress from Penn., 1849-55, and was appointed minister to Naples, 1868.

**CHANDLER**, SETH C., astronomer; b. Boston, Mass., 1845; long attached to the Harvard observatory; was awarded the gold medal of the Royal astronomical society of

London in 1896 for his determination of the laws of the movements of the earth's pole and his researches in the department of variable stars. He died in 1896.

**CHANDLER, WILLIAM EATON**, b. N. H., 1835; graduated from Harvard law school, 1855; was speaker of N. H. legislature, 1863-64; appointed judge-advocate-gen. of the navy dept., 1865; first asst. sec. of the Treasury under Sec. McCulloch for two years; secretary of the navy, 1882-83; elected to U. S. senate, 1887, 1889, and 1895.

**CHANDLER, ZACHARIAH**, b. N. H., 1813; d. Chicago, 1879. He was educated in a common school and seminary. At the age of 22, he went to Michigan and settled in Detroit, where he became a wealthy and prosperous merchant. He was an early and active member of the whig party, and in 1851 was elected mayor of the city. The next year he was nominated for governor, but was defeated. When the republican party was organized, he took an active part, and was by it chosen U. S. senator in 1856. In the senate he was a firm opponent of all schemes for the extension of slavery, and stood side by side with Benjamin Wade of Ohio, and others who resisted the arrogant tone of the extreme pro-slavery senators. When the civil war broke out, Chandler was one of the foremost in favor of a vigorous prosecution, and had little respect for those whom he denounced as traitors. In 1875, he was defeated for senator, but was at once appointed secretary of the interior, where his business talent soon became manifest in the improved administration of the department. In 1868, and again in 1876, he was chairman of the republican national committee, having the general management of the party canvass. The day before he died he made a powerful speech to a great mass-meeting.

**CHANDLER SCIENTIFIC DEPARTMENT** See DARTMOUTH COLLEGE.

**CHANDORE'**, a t. and fort in the district of Nasick (q. v.), presidency of Bombay, its lat. and long. being 20° 20' n. and 74° 14' east. C. is a flourishing place, with a pop. of about 5,000. The fort, which commands an important pass on the route between Candeish and Bombay, is situated on the summit of a hill naturally inaccessible everywhere but at the gateway. It surrendered to the British in 1804; and being subsequently restored to Holkar, was finally ceded by him in 1818.

**CHANDOS ANTHEMS**, a series of compositions, written by Handel for the chapel at Cannons, while he was musical director to the duke of Chandos, 1718-20. They contain airs, choruses, and overtures. The MSS. are in Buckingham Palace.

**CHANDOS CLAUSE**. During the discussion of the clauses of the reform (q. v.) bill in 1831, the marquis of Chandos (tory), afterwards duke of Buckingham, proposed the insertion of a clause giving the county franchise to *tenants at will* occupying lands for which they paid an annual rent of £50. This was opposed by the ministers on the ground that the class proposed to be enfranchised would be subject to the coercion of the landowners, who would thus virtually determine the elections. The amendment, however, was supported by many of the radicals, who at that time regarded any extension of the suffrage as a boon, and was carried by a majority of 84. The clause was incorporated in the bill of the following year, and was finally carried.

**CHANFRON**. A frontlet of metal, forming part of the suit of armor worn by a charger in mediæval times. Its place was between the eyes, protecting the frontal bone, and it was usually made with a projecting spike.

**CHANGARNIER, NICOLAS ANNE THÉODORE**, a French general, was born at Autun in 1793, and received his education at the military school of Saint-Cyr. In 1830, he went as lieut. to Algeria, where he distinguished himself, and rose to the rank of gen. of division. After the proclamation of the republic in 1848, he was appointed governor-general of Algeria, in the room of Cavaignac; but being chosen a member of the national assembly, he returned to Paris, when he was appointed commander-in-chief of the garrisons of Paris and of the national guard. He held this double office till the middle of May, 1849, and again for some time after the insurrectionary movement of June of that year. C. was a member of the legislative assembly, where he held a sort of neutral position between the orleanists and legitimists and opposed to the Bonapartists. At the *coup d'état* in December, 1851, after being imprisoned in Ham, he went into exile till the Franco-Prussian war, when he offered his services to Napoleon III. He was in Metz with Bazaine; and, on its capitulation, retired to Brussels. He returned to France in 1871, entered the assembly, and assisted M. Thiers in reorganizing the army. He died Feb. 14, 1877.

**CHANG-CHOW-FOO**, a city of China, and capital of a department of the same name, in the province of Fuh-keen, in 24° 31' n. lat., and 1° 24' long. e. of Peking.

**CHANGE**. See BELL; BELL RINGING; MODULATION.

**CHANGELING**. It was at one time a common superstition, that infants were taken from their cradles by fairies, who left instead their own weakly and starveling elves. The children so left were called *changelings*, and were known by their peevishness, and their backwardness in walking and speaking. As it was supposed that the fairies had no power to change children that had been christened, infants were carefully watched until such time as that ceremony had been performed. This superstition is alluded to

by Shakespeare, Spenser, and other poets; and it has not yet quite died out of some of the rural districts in Britain.

**CHANG-SHA-FOO**, a city of China, capital of the province of Hoo-nan, in 28° 20' n. lat.

**CHANLER**, AMÉLIE RIVES. See RIVES, AMÉLIE.

**CHANK-SHELL**, the popular name of the shell of several species of *turbinella*, a genus of gasteropodous mollusks of the group *siphonostomata* (q.v.), natives of the East Indian seas. These shells are obtained chiefly on the coasts of the s. of India and Ceylon, and form a considerable article of trade to Calcutta. They are much used as ornaments by Hindu women, the arms and legs being encircled with them; and many of them are buried with the bodies of opulent persons. Those which are thrown up on the beach, after the death of the mollusk, and have become whitened, are little valued, but fresh shells from Madras amounting to 2,480,727 in one year, the value of which was about \$50,000. The quantity ordinarily exported is smaller. A chank-shell opening to the right is rare, and is highly prized in Calcutta, so that a price of \$250, or even \$500, is sometimes paid for one.

**CHANNEL**, ENGLISH—the *mare Britannicum* of the ancients—is that arm of the Atlantic ocean which divides England from France, gradually narrowing to the strait of Dover. It is often called simply the Channel; and the fleet stationed in it for the protection of the English coast, the channel fleet. The greatest river which falls into it is the Seine. It forms bays both on the English and on the French coast; but the larger ones are those on the French coast, whilst the best harbors are on the English.

**CHANNEL ISLANDS**, a group of islands belonging to Great Britain, lying off the n.w. coast of France, between Normandy and Brittany. They are about 120 m. s.w. of Southampton, and the nearest distance from the French coast is about 10 miles. The C. I. are the only parts of the dukedom of Normandy now belonging to the English crown, to which they have been attached since the conquest. King John, about the year 1200, lost all Normandy, except these isles. The chief islands of the group are Jersey, Guernsey, Alderney, and Sark. The area of the whole is 76 sq.m., and the pop. in 1891 was 92,234. They are more particularly described under JERSEY.

**CHANNEL TUNNEL**. The proposed tunnel under the narrow channel dividing England and France would be twenty-three miles long, including land-approaches. It would be made entirely through and within the area of the old gray chalk, or *craie de Rouen*, as designated by the French geologists. This bed of chalk extends from shore to shore. It consists of a mixture of 65 per cent. of chalk and 35 per cent. of clay, and is therefore impervious to water, though the experimental works have shown cracks here and there, out of which for a time exuded fresh or brackish water, apparently imprisoned for ages in these small fissures. While the experimental works have been suspended, most of these fissures have run themselves dry. The French Tunnel Company, who possess a concession for making a tunnel to the middle of the channel, and the English Tunnel Company have made many thousands of soundings and experiments, and consider it proved that the gray chalk is not only in the same position and of the same thickness and consistency on both sides of the channel, but that no erosion or fault interfering with continuity exists between the two coasts.

The experimental works on the English side have been extended, by means of a boring machine, from the foot of Shakespeare's Cliff, near Dover, to a distance of 2200 yards under the sea. The similar work on the French side, from Sangatte, near Calais, is of about the same length. Thus, about a tenth of the whole distance has thus far been successfully tested, and the opinion of the engineers engaged is that the work presents exceptionally favorable features for cheap and rapid accomplishment. The original estimate before experiment showed the way through this favorable stratum of gray chalk was about \$50,000,000; now the estimates call for only \$20,000,000. The proposal is to have two single-line tunnels, one ventilating the other, and to work the lines by engines which have been successfully designed and worked experimentally, charged with highly compressed air. In the construction of the tunnel, hardly any pumping and no timbering would be required. The machine which does the boring takes up any modicum of water with the debris which it excavates; and every turn of it gives out a portion of the air, which, at a pressure of about 25 lbs. to the square inch, is its motive force.

The instruction to the engineers by Sir Edward Watkin, the chairman of the English Tunnel Company, "to find the gray chalk at its outcrop, and never leave it," would seem to have reduced a work which at one time appeared almost impracticable to the utmost simplicity and ease of accomplishment. The scheme for a railway tunnel was discussed in 1887 and the following years. In 1876, an agreement for carrying out the scheme was entered into between the French and English governments, and boring was begun on the French side, but the excavations on the English side were stopped by order of the British government, mainly for military reasons.

The engineers whose names have been associated with various schemes for a tunnel under the Channel are Thomé de Gamond and Raoul-duval in France; and William Low, Frederick Bramwell, Francis Bradv, John Hawkshaw, and Brunlees in England.

**CHANNING, EDWARD TYRREL, LL.D., 1790-1856;** brother of William Ellery Channing, D.D.; a lawyer of Boston, who devoted his attention chiefly to literature. In 1817-19, he edited the *North American Review*, and was a regular contributor to it through a large part of his life. He was professor of rhetoric and oratory in Harvard college, 1819-1851. A volume of his lectures was published in 1856.

**CHANNING, WALTER; 1786-1876;** a physician, native of Rhode Island, brother of William Ellery Channing, D.D. He studied medicine in Boston and Philadelphia, and in Edinburgh and London. In 1815, he was professor of obstetrics and medical jurisprudence in Harvard, resigning in 1854. He was also for 20 years physician of the Massachusetts general hospital. Among his writings are *Etherization in Childbirth*; *A Physician's Vacation, or a Summer in Europe*; *Professional Reminiscences of Foreign Travel*; *Old and New*; *Reformation of Medical Science*; and a volume of poems.

**CHANNING, WILLIAM ELLERY, D.D.,** a celebrated Unitarian preacher and author, was b. 7th April, 1780, at Newport, R. I., in the United States, entered Harvard university at the age of 14, and took his degree in 1798. In 1808, he was ordained minister of a church in Boston. During the earlier years of his ministry, his theological peculiarities had little prominence in his discourses, and in consequence he stood upon friendly terms with his brethren in more orthodox churches. In 1819, however, he preached a sermon at the ordination of the Rev. Jared Sparks, in which he advocated the Unitarian doctrine with so much zeal and ability, that he was termed the "apostle of Unitarianism." This involved him in controversy, a thing which he naturally loathed. Nevertheless, to the end of his life, he preserved a devoutly Christian heart, shrinking with the delicate instinct of a pious nature from everything cold, one-sided, and dogmatic, whether Unitarian or Trinitarian. As late as 1841, he wrote: "I am little of a Unitarian, have little sympathy with the system of Priestley and Belsham, and stand aloof from all but those who strive and pray for clearer light." It 1821, he received the title of D.D. from Harvard university, on account of the high talent he had exhibited in his tractate on the Evidences of Christianity, his Address on War, and his Sermons. In 1823, he visited Europe, and made the acquaintance of several great English authors, such as Wordsworth and Coleridge, both of whom were strongly impressed in his favor. Coleridge said of him: "He has the love of wisdom and the wisdom of love." In 1823, he published an *Essay on National Literature*; in 1826, *Remarks on the Character and Writings of John Milton*; in 1829, the *Character and Writings of Fénelon*; in 1835, a work in opposition to *Negro Slavery*; and in 1838, an essay on *Self-Culture*. Besides these, he wrote a variety of other essays and treatises, all characterized by vigor, eloquence, pure taste, and a lofty tone of moral earnestness. He died Oct. 2, 1842, at Bennington, Vt. An interesting memoir of him has been published by his nephew William Henry Channing (3 vols., London, 1848), and reprinted in 1880.

**CHANNING, WILLIAM HENRY, b. Mass., 1810;** nephew of William Ellery Channing, D.D. He graduated at Harvard in 1829, at Cambridge divinity school in 1833, and was ordained in charge of a Unitarian church at Cincinnati in 1835. After filling several pastorates in this country he succeeded James Martineau as minister of the Hope street Unitarian chapel, Liverpool, England. On the commencement of the rebellion he returned and took charge of the Unitarian church in Washington. He was one of the early supporters of the socialistic movement in this country, was editor of *The Present* and *The Harbinger*, and in 1848 presided over a socialistic association in Boston. He was a prolific writer, contributing to the *North American Review*, *The Dial*, *The Christian Examiner*, and other serials. Among his larger works are a translation of Jouffroy's *Ethics*; *Memoir of William Ellery Channing*; *Memoirs of the Rev. James H. Perkins*; *Memoirs of Margaret Fuller Ossoli*; and a work on *The Christian Church and Social Reform*. He d. 1884.

**CHANSON** (French), a short song or poem of separate stanzas, or divisions, called couplets, having one, or two, lines of refrain, and written in an easy, natural, flowing rhythm and style. It has been said that *En France on met tout en chansons*, and in the chanson one may read a review of the entire history of that country—political, religious, literary, and social. The chanson had its beginning in the admirable, but short-lived literature of the troubadours and northern trouvères of the 11th to the 15th centuries, whose romances and fabliaux were sung by the jongleurs, or wandering minstrels, to the accompaniment of the harp. These were held in such esteem that we find Philip le Bel enlisting *chansonniers* in his service. A few choice spirits stand out from the mediæval chansonniers, viz.: Théroutle, the supposed author of *La Chanson de Roland* (q.v.); Thibaut de Campagne; Froissart; Charles d'Orléans; and Eugène Deschamps, the Béranger, and Olivier Basselin, the Désangiers of the 15th century. With the Reformation the religious element burst through France and colored the chanson with patriotic and religious zeal, and rhymed denunciations of important persons of the times was another feature. Clement Marot belongs to this period. The Renaissance produced style in the lyric poetry of France, as well as beauty, and Malherbe assigned to this the strict laws which were preserved until the beginning of the present century. The disorder of the Fronde also had its effect on the chanson, leaving it conspicuous for its lack of taste and delicacy. In the reign of Louis XVI. the chanson became military and revolutionary, and such songs as *La Marseillaise* (q.v.); *Ça Ira* (q.v.); *Le Chant du Départ* (q.v.), and *La Carmagnole* (q.v.) were produced. With the intellectual revival after 1830, Casimir



Delavigne, Alfred de Musset, Lamartine, Béranger, and Victor Hugo, lifted the *chanson* into a work of beauty, dignity, and in many instances of strength. The *chanson* may be classed under four divisions: the *chanson historique*, *chanson de métier*, *chanson d'amour*, and *chanson bachique*. The *chanson historique* comprises the cantique Noël—Christmas carol, complaints, or laments, and songs on historical themes, or narratives. The *chanson de métier* is a cry from different conditions of men. The *chanson d'amour* is on the theme of love, and exhausts all resources of rhythm, viz., the lai, accompanied by the rote, or *vieille*; the *virelai*, turning on two rhymes; the *descort*, in which the melody is changed with each couplet; also the *aubade*; the *chant royale*, the *ballade*, the *brunette*, the *rondeau*, and the *triolet*, all precursors of the modern romance. The last class, the *chansons bachiques*, are songs in which the bacchanalian element is prominent, songs in praise of the vine, or of convivial character. There are also a number of other songs—*chansons de geste*, *chansons à danser*, *chansons farcie*, etc. See Raynouard, *Choix des Poésies originales des Troubadours*; Fabliaux et Contes des Poètes Français, edited by Meon (Paris, 1808); Leroux de Lincy, *Chants historiques Français depuis le XIIe jusqu'au XVIIIe Siècle* (Paris, 1841); Nisard, *Chansons populaires chez les anciens et chez les Français* (Paris, 1867); Du Mersan, *Chants et Chansons populaires de la France* (Paris, 1848); Coussemacker, *Chants populaires des Flamands de France* (Ghent, 1856); Verriest, *Rondes et Chansons populaires illustrées* (Paris, 1876).

**CHANSON DU ROLAND** (or RONCEVAUX). See ROLAND.

**CHANT** (see AMBROSIAN CHANT, and GREGORIAN CHANT), a modification between singing and recitative especially used for litanies and psalms in the Roman Catholic and Protestant Episcopal service. The chant is the ancient style of church-song, certainly as old as Christianity, which seems to have inherited it from the Jewish church. St. Paul exhorts believers to sing (to chant) psalms and hymns and spiritual songs; and Pliny the younger mentions the early morning assembling of Christians to chant hymns to Christ. As rhymed and metrical hymns, now so common, were the product of a later art, so the tunes accompanying them are modern as compared with chants. Chanting, commended by its grand simplicity, is growing in favor.

**CHANT DU DÉPART, LE**, French revolutionary song, words by Marie Joseph Blaise de Chénier, music by Méhul. It was composed for the fête on the fourth anniversary of the taking of the Bastille, July 14, 1794. This is the only French national air written during the Reign of Terror, and when sung it created as great an effect as *La Marseillaise* (q.v.).

**CHANTILLY**, an estate in Fairfax co., Va., 20 m. w. of Washington, where, Sept. 1, 1862, a battle occurred between the right of the union army under Pope and the confederates under Jackson. The battle continued, in spite of a severe thunder-storm, until dark, but without important results. The union general, Isaac I. Stevens, was killed in the battle, and Philip Kearny, in a reconnaissance after its close.

**CHANTILLY**, a t. of France, in the department of Oise, about 23 m. n.e. of Paris. Being one of the most beautiful places in the vicinity of the metropolis, it attracts thence immense numbers of visitors. Apart from its natural beauty, it is interesting as the place where the great Condé spent the latter years of his life in the society of such men as Boileau, Racine, and Bossuet. The magnificent château in which he resided was pulled down at the revolution of 1793; but a lesser château, one of the finest specimens of the renaissance in France, still remains. The park and grounds are very charming. C. is also noted for its extensive manufacture of the *blonde lace*. Pop. '91, 4231.

**CHANTREY**, Sir FRANCIS, an eminent English sculptor, was b. at Jordanthorpe, in Derbyshire, on 7th April, 1781, not 1782, as has been generally said. His father, who was a carpenter, and rented a small farm, died when C. was only 12 years of age, leaving his mother in narrow circumstances. It is said that she gave him "as liberal an education as her limited means would admit;" but much cannot be meant by the phrase, if it be true, as asserted by Holland in his *Memorials*, that his attendance at the little lane-school was very irregular, and that "for a while he certainly drove an ass daily, with milk-barrels, between Norton and Sheffield." C.'s mother married a second time, and the boy was, in 1797, apprenticed for 7 years to a carver and gilder in Sheffield called Ramsay. It was in this humble department that C. acquired the rudiments of his future art. It was during this period that his first attempts at modeling in clay were made, and that by the help of casts taken from the faces of his fellow-apprentices and his own, he began the work of portraiture, in which his great eminence ultimately consisted. C.'s apprenticeship was canceled two years before its expiry; but his subsequent career is not very accurately known. It is certain that he visited both London and Dublin in 1802, probably in the capacity of a journeyman carver and gilder; and in that year he seems to have received instruction as a pupil of the royal academy. It was probably then that he commenced seriously to prepare himself for the work of his future life. In the earlier part of his career as an artist, C. is said to have been under great obligations to Nollekens, who had the shrewdness to see, and the generosity to see without envy, his great promise in the branch in which he himself was eminent. In 1816, C. was elected an associate, and in 1818 a member of the royal academy; and in 1819 he visited Italy for the first time. Although he executed an almost countless number of works, he never attained high rank. He died Nov. 25, 1841.

**CHANTRY** (Fr. *chantererie*, from *chanter*, to sing). The term C. is applied alike to endowments or benefices, to provide for the chanting of masses, and to the chapels in which the chanting takes place. These endowments were commonly made in the form of testamentary bequests, the object being to insure the erection of a chapel near or over the spot where the testator was buried, and to remunerate the priests for saying masses in it for the benefit of his soul, or of the souls of others named in his will. Many such chantry chapels are still to be seen in English parish churches; but they were more common in abbeys and monastic establishments, in which it was considered a privilege to be buried, and where some such offering to the brotherhood was, in a measure, the price of sepulture. These chapels, which have generally the tomb of the founder in the middle of them, are separated from the aisles or nave of the church by open screen-work, a circumstance which has sometimes led to their being called *chancels* (q.v.). Sometimes, again, they are separate erections, projecting from the church externally; but in cathedrals and the larger churches they are generally constructed within the church, often between the piers. Many chantries are lavishly enriched with sculpture and tracery of all descriptions, and some of them are adorned with gilding and painting.

**CHANZY**, ANTOINE EUGÈNE ALFRED, b. 1823; a French general, first served as an apprentice in the navy. In 1843 he graduated from the Paris Military School as sub-lieut. of zouaves. He served in Algeria, Italy, and Syria, and again in Algeria. In 1868 he became gen. of brigade, and early in the Franco-Prussian war he rose to commander-in-chief of the second army of the Loire. During the supremacy of the commune, he narrowly escaped death. In 1872 he was elected to the national assembly; in 1875 was chosen senator for life; in 1878 received the grand cross of the Legion of Honor; and in 1879-81 was ambassador to Russia. He d. 1883.

**CHAOS** signified, in the ancient cosmogonies, that vacant infinite space out of which sprang all things that exist. Some poets make it the single original source of all; others mention along with it Gæa, Tartaros, and Eros. By some also only the rough outlines of heaven and earth were supposed to have proceeded from C., while the organization and perfecting of all things was the work of Eros. Still later cosmogonists, such as Ovid, represent it as that confused, shapeless mass out of which the universe was formed into a *kosmos*, or harmonious order. Hesiod makes C. the mother of Erebus and Nox.

**CHAOS** or **BIRD ISLANDS**, is the name given to several rocky islets situated at the entrance of Algoa Bay, South Africa, about 35 m. e. of Port Elizabeth. It was on one of these islands that Bartholomew Diaz, the navigator, died in 1500.

**CHAPALA**, the largest lake in Mexico, containing about 1300 sq. miles. It is about lat. 20° 20' n., and ranges in w. long. from 102° to 103° 25'. It is merely an expansion of the Rio Grande de Lerma, which enters the Pacific at San Blas. C. lies on the table-land of Anahuac, and has many islands.

**CHAP BOOKS**, the name given to a variety of old and scarce tracts of a homely kind, which at one time formed the only popular literature. In the trade of the bookseller, they are distinguishable from the ordinary products of the press by their inferior paper and typography, and are reputed to have been sold by chapmen (see **CHAPMAN**) or peddlers; hence their designation. The older C. B. issued in the early part of the 17th c. are printed in black letter, and are in the form of small volumes. Those of a later date are in the type now in use, but are equally plain in appearance. Of either variety, they were mostly printed in London; many being without dates. They were of a miscellaneous kind, including theological tracts, lives of heroes, martyrs, and wonderful personages, interpretations of dreams, fortune-telling, prognostications of the weather, stories of giants, ghosts, hobgoblins, and witches, histories in verse, and songs and ballads. See *Notices of Fugitive Tracts and Chap Books*, also *Descriptive Notices of Popular English Histories*; both by J. O. Halliwell, printed for the Percy society. An inferior class of tracts succeeded these books for the common people, and are best known as *Penny Chap Books*. For the most part they consisted of a single sheet, duodecimo, or 24 pages. Besides the title, the first page usually contained a coarse wood-cut embellishment. The paper was of the coarsest kind adapted for printing, and the price, as the name imports, was a penny each. The subjects besides being of a similar nature to the above, included stories of roguery and broad humor. These penny C. B. were issued by an obscure class of publishers in London and several English provincial towns, of which we might particularize Newcastle-on-Tyne. They were also issued from the presses of Edinburgh, Glasgow, Falkirk, and Paisley. It is a curious fact, that nearly all the penny C. B. of this very homely kind which were latterly popular, were written by Dougald Graham, who, previous to his death in 1779, filled the office of bellman or town-crier of Glasgow. The most reputable production of this humble genius was a *History of the Rebellion* in a Hudibrastic meter, which was a great favorite with sir Walter Scott, and is now scarce; see *Chambers's Journal*, first series, vol. x. p. 84; also the *Paisley Magazine* (1829), an extinct publication of great rarity, in which is given a biographic sketch of Dougald Graham, with a list of his productions. In some parts of Scotland and the n. of England, Graham's penny C. B. are still seen on stalls at markets; but the general advances in taste, along with the diffusion of an improved literature, have displaced them in almost all other quarters. Collections of the older C. B. are now found only in the libraries of bibliomaniacs, by whom they have been picked up at extravagant prices from dealers in second-hand books. In various continental

countries, there are numerous varieties of C. B. at exceedingly small prices. See John Ashton's *Chap Books of the Eighteenth Century* (1883).

**CHAPEL** (Fr. *chapelle*), a word derived from *capa*, which originally signified a case, or chest in which were contained the relics of a saint, and afterwards the place where the chest was kept. The term now signifies a building erected for the purposes of public worship, but not possessing the full privileges and characteristics of a church. In this sense, all places of worship erected by dissenters are now called chapels in England, and the term is also applied to supplementary places of worship, even though in connection with the established church—such as parochial chapels, chapels of ease, free chapels, and the like. In former times, it was applied either to a domestic oratory, or to a place of worship erected by a private individual, or a body corporate. In the latter sense we speak of chapels in universities and colleges. But its earliest signification was that of a separate erection, either within or attached to a large church or cathedral, separately dedicated, and devoted to special services. See **CHANTRY**. Chapels had no burying-ground attached to them, and the sacrament of baptism was not usually administered in them.

**CHAPELAIN, JEAN** (1595-1674), was born in Paris. His father, a notary, had destined him for his own profession, but under the influence of his mother, Chapelain began at an early age to qualify himself for literature, acquiring Greek, Latin, Italian, and Spanish. He was for a time engaged in teaching Spanish to a young nobleman, and was then appointed tutor to the two sons of M. de la Trousse, grand provost of France, in whose family he remained for seventeen years. His earliest works were a preface for the *Adone* of Marini, a translation of Mateo Aleman's novel, *Guzman de Alfarache*, and four odes, of no great merit, one of which was addressed to cardinal Richelieu. Chapelain drew up also for the newly-constituted Academy a plan of the grammar and dictionary which were to form the principal work of the young institution. In 1657 he published the first twelve cantos of his epic, *La Pucelle*, on which he had been engaged for twenty years. The epic dealt with the story of Joan of Arc, and was intended to comprise twenty-four books or cantos. His reputation at this time had become so great that six editions of the poem were disposed of in eighteen months. The work, however, brought down upon Chapelain the severest criticism from Boileau and others, and he was ridiculed to such an extent that the last twelve books were never published. A complete manuscript of *La Pucelle* exists in the Bibliothèque Nationale.

Though his epic was so unsuccessful, Chapelain seems to have had considerable merit as a prose writer and critic. His criticisms are remarkable for their justice and generosity, and his erudition and kindness of heart are everywhere apparent. Racine was indebted to him for kindly and seasonable counsel, as well as for a pension of six hundred livres. Chapelain became in his old age a miser of the most sordid type, leaving behind him at his death a fortune of 50,000 crowns.

**CHAPEL HILL**, a village in Orange co., N. C., 28 m. n.w. of Raleigh; pop. 1017. It is the seat of the University of North Carolina, opened in 1795.

**CHAPELLE ARDENTE** (Fr. "glowing chapel"), a room or mortuary chapel wherein the dead body of a person of high rank, whether ecclesiastical or civil, is laid. The hangings are in black, and burning candles illumine the scene until the final removal for burial. The custom is of great antiquity in the Catholic church.

**CHAPELLE DE FER**. See **HELMET**.

**CHAPEL ROYAL**, in the English ecclesiastical establishment, is composed of two deans (a dean and sub-dean), forty-eight royal chaplains, ten priests, and a lay-choir, styled "gentlemen of the chapel," a clerk and several deputy-clerks of the closet, and an organist. The chaplains are required to preach, each a certain number of times a year, while the dean, sub-dean, and priests read the liturgy. The services are performed at London, in the small oratory in St. James's Palace. In Scotland the appointments to the Chapel Royal are purely honorary, involving no service and carrying with them no compensation, though formerly it was attached to the palace at Holyrood and corresponded with the similar establishment in England.

**CHAPERON**, a hood or cap worn by knights of the garter. Such a hood was at one time in general use, but was lately appropriated to doctors and licentiates in colleges. A person who acts as a guide and protector to a lady at public places, is called a C., probably from this particular piece of dress having been used on such occasions. The name was also applied to devices which were placed on the heads of horses at pompous funerals.

**CHAPIN, AARON LUCIUS**, D.D., b. Conn., 1817; a graduate of Yale, and Union (N. Y.) theological seminary. In 1838, he was a professor in the New York institution for the deaf and dumb. In 1844, he became pastor of the First Presbyterian church in Milwaukee, Wis.; and in 1850 was chosen first president of Beloit college, an office which he held till 1886, when he resigned. He was for some years one of the editors of the *Congregational Review*. He d. in 1892.

**CHAPIN, ALFRED CLARK**, was born in South Hadley, Mass., in 1848, and studied at Williams college, graduating at the age of twenty-one. He devoted two years to the study of law in the Harvard law school, graduating in 1871; was admitted to the New

Hampshire bar the same year, and to the New York bar the following year. In 1873 he went to Brooklyn; assisted in organizing the Young Men's Democratic Club in 1880, becoming its first president; went to the Assembly in 1881; was re-elected to the Assembly in the following year; was chosen speaker in 1883; elected state comptroller 1883 and 1885; mayor of Brooklyn in 1887 and 1889; member of congress in 1891; and became a State railroad commissioner in 1892.

**CHAPIN, EDWIN HUBBELL, D.D.**, 1814-80, b. Washington co., N. Y.; educated at a seminary in Bennington, Vt., and commenced preaching in Richmond, Va., to a congregation of Unitarians and Universalists. In 1846 he went to Massachusetts, and in 1848 to New York, where he became pastor of the Fourth Universalist church, one of the wealthiest churches in that city, and remained until his death. In 1872 he succeeded Dr. Emerson as editor of the *Christian Leader*, the principal Universalist paper. Dr. Chapin was a most effective and gifted speaker, and exerted a powerful influence for good. Besides his regular sermons he delivered a great number of lectures, and published several volumes, among which are *Duties of Young Men*; *Duties of Young Women*, *Characters in the Gospels*; *Communion Hours*; *Discourses on the Lord's Prayer*; *Crown of Thorns*; *The Beatitudes*; *Moral Aspects of City Life*; and *True Manliness*.

**CHAPLAIN** was originally the title of the ecclesiastic who accompanied an army, and carried the relics of the patron saint. See **CHAPEL**. It has now come to signify a clergyman not having charge of a parish, but employed to officiate at court, in the household of a nobleman, or in an army, garrison, ship, etc. Such officials began early to be appointed in the palace of the Byzantine emperors. The practice afterwards extended to the western empire, and to the courts of petty princes and even of knights, and continued to subsist after the reformation. Forty-eight clergymen of the church of England hold office as chaplains of the queen in England, four of whom are in attendance each month. Six clergymen of the church of Scotland have a similar title in Scotland; but their only duty is to conduct prayer at the elections of Scottish representative peers. A statute of Henry VIII. limits the right of nominating private chaplains in England: thus, an archbishop may have eight, a duke six, a baron three; and chaplains so appointed have certain privileges, and may hold two benefices with cure of souls. In the United States the term chaplain is officially used only of the chaplain of the senate and of the house of representatives, and in the army and the navy. In some of the states there are chaplains for one or both of the legislative bodies. In the army there are both post and regimental chaplains; and there is usually a chaplain in every regiment of militia, though they are not always ordained clergymen. In the navy there are a certain number of chaplains, according to the number of vessels in commission. It is usual, also, to appoint chaplains to state prisons, to reformatory institutions, and to asylums. Where there are radical differences of religious belief to any considerable extent, as in the institutions of New York city, chaplains of Protestant, Roman Catholic, and Jewish faith are employed or permitted to officiate.

**CHAPLET**, a garland or head-band of leaves and flowers. In heraldry, a C. is always composed of four roses, the other parts being leaves.

**CHAPLIN, JEREMIAH, D.D.**, 1776-1841; a native of Massachusetts, graduated at Brown university, and for some years a tutor there. He was for 16 years pastor of a Baptist church in Danvers, Mass., and from 1820-32 President of Waterville college.

**CHAPMAN**, a trader, but popularly applied in a more limited sense to a dealer in small articles, who travels as a peddler or attends markets. C. is from *chap*, equivalent to *cheap*, a word which in its origin signified a market or place for trading; hence *Cheap-side*, *Eastcheap*. See **CHAP BOOKS**.

**CHAPMAN, GEORGE**, dramatist and translator, was b. in 1557, educated at Cambridge and Oxford, and was the cotemporary and friend of Spenser, Jonson, and Shakespeare. His first play, entitled *The Blind Beggar of Alexandria*, was printed in 1596. Up to 1620, he supplied the theater with tragedies and comedies, and some of these, after the fashion of the time, were written in conjunction with other dramatists. As a writer for the stage, C. does not rank high. Despite many nervous passages, his plays want the irradiation of a constant genius, and his characters are unnatural. His translation of Homer is the most vigorous that has yet been executed in England, and in reading it, many have felt with Keats—

Like some watcher of the skies  
When a new planet swims into his ken.

C. seems to have led a long, temperate, and happy life, unblasted by poetic fire. He died in 1634. Swinburne, the poet, published an edition of C.'s works, with a critical introduction, in 1875.

**CHAPMAN, JOHN GADSBY**, b. Va., 1808, died in 1889. He studied art in Rome, and returned to New York, where he had a studio, but not long afterwards went back to Rome, residing there many years. Among his paintings are, "The Baptism of Pocahontas" (for the capitol in Washington); "An Etruscan Girl;" "The Israelites Spoiling the Egyptians;" "The First Italian Milestone;" "A Donkey's Head;" and "The Last Arrow." He published a drawing-book that attained great popularity.

**CHAPMAN, MARIA WESTON**, daughter of Warren Weston, was born in Weymouth, Mass., in 1806, and died there in 1885. She was educated partly in Weymouth, partly

in England. In 1829-30, she was principal of the Young Ladies' High School in Boston. Her husband, to whom she had been married in 1830, died in 1842. Mrs. Chapman was an active abolitionist. The years 1843-56 she spent abroad, chiefly in Paris, writing in support of the anti-slavery movement. After her return to America in 1856, she published the autobiography of Harriet Martineau, who was her intimate friend.

**CHAPONE, HESTER**, authoress, daughter of Thomas Mulso, was born at Twywell, England, in 1727. She wrote a short romance in her tenth year, and after her mother's death her attention was divided between household duties and the study of French, Italian, Latin, music, and drawing. She was an intimate friend of Elizabeth Carter and Mrs. Montague. She wrote for the *Rambler*, *Adventurer*, and *Gentleman's Magazine*, and soon became known to a literary circle. She wrote an *Ode to Peace* and other poems, and *Miscellanies in Prose and Verse*, but she is now chiefly remembered by her *Letters on the Improvement of the Mind* (1772), which went through many editions. In 1760, she was married to Mr. Chapone, who died ten months afterward. She herself died in 1801. See Mrs. Elwood's *Memoirs of the Literary Ladies of England from the Commencement of the Last Century* (1843).

**CHAPPE, CLAUDE**, 1763-1805; b. in Rouen, France; the inventor of the first working telegraph of any importance. His invention consisted of an upright post, on the top of which was fixed a transverse bar, and at the ends of the bar two smaller arms movable on pivots. The position of the bars represented letters or words; and by means of such machines placed at remote but easily visible points, messages were conveyed fifty leagues in a quarter of an hour. Until almost the period of electric telegraphy, the machine was used especially for noting the arrival of ships. C. was so much annoyed by charges that he had copied his invention from others, that he committed suicide.

**CHAPPED HANDS AND CHILBLAINS**, a lesser and a greater form of disease of the skin, produced by undue exposure to extremes of cold and heat, and affecting chiefly the most exposed joints, the skin over which swells and cracks, with itching, pain, and heat; in the most severe cases there is ulceration, which is difficult to heal in proportion to the length of time the disease has been neglected. Chilblains may generally be avoided if the hands are washed always with tepid water, and not habitually exposed to great cold, or when cold, to the heat of a fire. When formed, they may be treated with oxide of zinc ointment; or with a dilute solution of borax in glycerine and water; or with glycerine alone, slightly diluted with water; the hands being in any case habitually covered with woolen gloves in cold weather.

**CHAPSAL, CHARLES PIERRE**, 1787-1858; a French grammarian, joint author (with François Joseph Noel) of the *Nouvelle Grammaire Française, avec Exercices*, one of the most widely adopted of all grammars of that language. The proceeds of the book gave him a fortune, much of which was given to charities, among which was one bequest of 80,000 francs to the teachers in the environs of Paris.

**CHAPTAL, JEAN ANTOINE**, 1756-1832, count of Chanteloup, a French chemist and statesman. He was professor of chemistry at Montpellier, where he taught the doctrines of Lavoisier instead of those of Stahl. By the death of an uncle, C. acquired capital, which he employed in manufacturing mineral acids, alum, white lead, soda, and other chemical wares. After the revolution of Nov. 9, 1799, he was made a councillor of state by Napoleon, and succeeded Lucien Bonaparte as minister of the interior, in which capacity he established a school of arts, and a society of industries. He also reorganized the hospitals, introduced the metrical system of weights and measures, and otherwise greatly encouraged arts and sciences. On Napoleon's return from Elba, C. was made director-general of commerce and manufactures, and minister of state. The downfall of the empire sent C. to private life, but he kept his interest in science, and in 1816 was named member of the academy. See Flourens's *Eloge historique de Chaptal* (1836).

**CHAPTER-HOUSE** (Fr. *chapitre*), the building in which the monks and canons of monastic establishments, and the dean and prebendaries of cathedral and collegiate churches, meet for the management of the affairs of their order or society. See **CATHEDRAL**. Chapter-houses frequently exhibit the most elaborate architectural adornment, as, for example, those at York, Southwell, and Wells. The original stained-glass windows remain at York, and are of exquisite beauty. On the walls of that at Westminster, the original painting has been discovered. Chapter-houses are of various forms: those at York and Westminster are octagonal; those at Oxford, Exeter, Canterbury, Gloucester, etc., are parallelograms; Lichfield is an oblong octagon; Lincoln, a decagon; and Worcester, a circle. They are always contiguous to the church, and are generally placed to the west of the transepts. They generally either open into the church, or are entered by a passage. Chapter-houses were often used as places of sepulture, and have sometimes crypts under them, as at Wells and Westminster.

**CHAPU**, a maritime t. in the province of Che-Keang, China, 50 m. n. w. of Chinhal in one of the richest districts in the country. It is the port of Hang-Chow.

**CHAPULTEPEC**, a fortress on a mound of rock about 200 ft. high, 2 m. s.w. of the city of Mexico. In the war with the United States this fortress, one of the chief defenses of the city of Mexico, was taken (Sept. 12, 1847) by Gen. Scott, and the city itself was captured the next day.

**CHARACEÆ**, aquatic plants, forming, according to some botanists, a distinct natural order of acotyledonous plants; according to others, a sub-order of *algæ*. Their stems are tubular, consisting either of a single tube, or of parallel tubes, a central one with smaller ones applied to its surface; they are either pellucid or incrustated with carbonate of lime, which is not to be regarded as a mere accidental incrustation, but belongs to their proper structure; and they have whorls of symmetrical tubular branches. They grow in stagnant waters, both fresh and salt, are always submersed, and often completely conceal muddy bottoms. A number of species are natives of Britain, all belonging to the genus *chara*. The organs of reproduction are of two kinds—lateral *globules*, and axillary *nucules*. These organs have caused no little difficulty to botanists; the nature and use of the globules in particular being by no means well understood. The simple cellular structure of the C., apart from all consideration of their reproductive organs, associates them with the lower *algæ*, rather than with phanerogamous plants. None of them is of any known use. It was in the C. that the beautiful phenomena of *cyclosis* (q.v.) were first observed. Sir David Brewster discovered that each of the minute calcareous particles incrusting the C. possesses double refraction, and has regular neutral and depolarizing axes.

**Fossil Characeæ.**—The calcareous incrustation which covers the organs of reproduction, as well as the stems of some C., has, from its power of resisting decomposition, caused the abundant preservation of this order in the tertiary fresh-water strata. The nucules originally described under the name of *gyrogonites*, and supposed to be foraminiferous shells, have been noticed by E. Forbes in strata as old as the middle Purbeck beds. No remains of these have been observed in newer deposits, until we find them in the tertiaries. The nucules, associated with *lymnæa* and *planorbis*, are very abundant in the eocene Bembridge beds (q.v.).

**CHARACINIDÆ.** See SALMONIDÆ.

**CHARACTER** (Gr. *charasso* or *charatto*, which signifies to scrape, cut, or engrave) means what is engraven on an object, either physically by the action of another external object or objects, or morally by the passions, the affections, by good or evil fortune, and by what we designate generally as "circumstances." In art, the expression of C., either in animate or inanimate objects, is, after correct delineation, the most important matter to be attended to. Though, properly speaking, all distinguishing marks are included under it, it is more generally used to designate those which mark individual from individual, than species from species, or genus from genus.

**CHARACTERISTIC.** See LOGARITHMS.

**CHARACTER TO SERVANT.** The general rule is that false statements, whether oral or written, made by one person concerning another, and resulting in injury, though uttered without any wrongful motive, give rise to a cause of action for damages. But a former master, who acts with honest purpose and states only what he believes to be true, may give a character to a discharged servant or to one voluntarily quitting his employ, and incur no liability, even though the communication be prejudicial and false. Such statements are embraced within that class of communications which are said to be conditionally privileged. (See LIBEL; MALICE; SLANDER.) The conditional elements are that the master must act in good faith, and must make the communications to those only who are properly interested in them, such as persons who contemplate employing the servant. If a false character be given maliciously, it will render the master liable. And by malice is here meant actual malevolent notice and evil intent. If made to strangers who have no interest in knowing the character of the servant for the purpose of hiring or dealing with him, the communication is not privileged. The master is under no legal obligation to give a character to his servant; but if, having done so, he discovers that he was mistaken, he should at once make known the truth to the person to whom the character was given. If he does not exercise due care and accuracy in making such communications to persons properly entitled to inquire, and injury to such persons result, he will be legally responsible. The master need not wait to be questioned concerning the servant's character. He may, provided he acts *bona fide*, affirmatively intervene and give information to one about to hire the servant. In actions by a servant for libel or slander growing out of these communications, the burden of proving falsehood and actual malice on the part of the master rests upon the plaintiff.

**CHARADE**, or "syllable-puzzle" as the Germans call it, is an amusement which consists in dividing a word of one or more syllables into its component syllables, or into its component letters, predicating something of each; and then, having reunited the whole, and predicated something of that also, the reader or listener is asked to guess the word. As a specimen of the C. depending upon syllables, we adduce the following:

"My *first* is plowed for various reasons, and grain is frequently buried in it to little purpose. My *second* is neither riches nor honors, yet the former would generally be given for it, and the latter are often tasteless without it. My *whole* applies equally to spring, summer, autumn, and winter; and both fish and flesh, praise and censure, mirth and melancholy, are the better for being in it. *Ans. Sea-son.*"

As a specimen of the second class of charades, we take the following happy example from the French:

"Quatre membres font tout mon bien,  
Mon dernier vaut mon tout, et mon tout ne vaut rien."

The word is *zéro*. It is composed of four letters, of which the last—viz., *o*, is equal to *zéro*; the whole, zero itself, being equal to nothing.

But besides charades of this nature, there is another kind rather popular at evening-parties—the *acted C.*: the character of which is entirely dramatic. Half a dozen or so of the company retire to a private apartment, and there agree to select a certain word, as the subject of the *C.*; let us suppose *INNKEEPER*. The next thing done is to take the first syllable, *INN*, and arrange a little scene and dialogue, each member taking a certain part. This being accomplished, the amateur actors return to the drawing-room, and commence their performance, the rest of the company constituting the spectators. Care is taken to mention conspicuously, and yet not obtrusively, in the course of the dialogue, the word *INN*, which is the subject of the scene. On its conclusion, they again retire, and devise a new series of incidents for the word *KEEPER*, generally something in connection with a menagerie or a madhouse. This being also represented, they retire for a third time, to contrive the final scene, into which both words, or rather the whole word, *Innkeeper*, must be dexterously introduced at an odd moment when the spectators are thought to be off the scent. The company are then asked to guess the word. In order to the effective performance of a *C.* of this sort, the actors must possess a good share of inventiveness, self-possession, and ready talk, as the greater portion of the dialogue has to be extemporized.

**CHARADE'ADZE**, a large family of birds, of the order *grallatores*, and tribe *prossirostres*, chiefly abounding in the temperate parts of the old world, and generally frequenting sandy unsheltered shores and open moors and downs. They have a short bill, generally soft at the base, hard and often a little inflated towards the tip; long and powerful wings; long legs; and short toes, generally only three in number, and all directed forward, but sometimes they have also a very small hinder toe. They run with great swiftness; they generally congregate in flocks, at least during certain parts of the year; many of them are nocturnal in their habits; many are migratory. The plovers (*charadrius*) have given their name to the family, which includes also lapwings, pratincoles, oyster-catchers, turnstones, sanderlings, etc.

**CHARBAR**, or **CHOUBAR BAY**, a harbor in the Indian Ocean on the coast of Beloochistan; 25° 16' n., 60° 35' east. The town of Charbar at the entrance is garrisoned by the sultan of Oman. Near by are the ruins of the early Portuguese settlement of Tees.

**CHARBON ROUGE**, or **RED CHARCOAL**, is a variety of charcoal obtained by subjecting wood to the action of heated air from furnaces, or of steam, which has been raised to a temperature of 573° F. Air-dried wood, by the ordinary process of charring, yields at the best 21 to 26 per cent of black charcoal; but when acted on by heated air or steam, as mentioned above, 36 or 42 per cent of C. R. is obtained. It is now prepared largely in France and Belgium, and is used in stoves for heating, and in the preparation of gunpowder. It has a dark-red color, and consists of about 75 per cent pure carbon, and 25 per cent hydrogen and oxygen.

**CHARCAS**. See **CHUQUISACA**.

**CHARCOAL** is a popular term applied to charred wood, or coal produced by charring wood. There are several other varieties of C., however, for which see **BONE-BLACK**; **CARBON**; **COKE**; **LAMP-BLACK**; **WOOD CHARCOAL**.

**CHARCOAL BLACKS** are made both from animal and vegetable substances—e.g., burnt ivory, bones, vine-twigs, peach-stones, nut and other shells, the smoke of rosin condensed, etc. Those which are derived from vegetable substances, when mixed with white, are usually of a blue tint. See **LAMP-BLACK**.

**CHARCOT**, **JEAN MARTIN**, was born at Paris in 1825, obtained his degree of M.D. in 1853, and in 1856 was appointed physician to the Central Bureau of Hospitals. His reputation is due in great measure to his investigations into the maladies of the nervous system. In 1873 he was elected a member of the Academy of Medicine in the section of pathological anatomy. His various works are entitled: *De l'Expectation en Médecine* (1857); *De la Pneumonie Chronique* (1860); *La Médecine Empirique et la Médecine Scientifique* (1867); *Leçons Cliniques sur les Maladies des Vieillards* (1868); *Leçons sur les Maladies du Système Nerveux* (1873); *Leçons sur les Maladies du Foie, des Voies Biliaires et des Reins* (1877); *Leçons sur les Maladies du Système Nerveux faites à Salpêtrière* (1880). M. Charcot also annotated the French translation of Baring Garrod's *Treatise on Gout*. He was one of the directors of the *Archives de Physiologie*, and was decorated with the Legion of Honor. He d. in 1893.

**CHARDIN**, **SIR JOHN**, 1648-1713; a native of Paris, the son of a jeweler, and bred to the same business; but preferring adventure he traveled in Persia and India in 1665-69. Two years later he made a second and more extended journey of four years. In 1681, he settled in London, and was knighted by Charles II. In 1686, he published a portion of the *Travels of Sir John Chardin into Persia and the East Indies*, etc. The complete account of his travels, however, did not appear until 1711.

**CHARENTE**, a considerable river in the w. of France, rises in the department of Haute-Vienne, about 14 m. n.w. of Chalus. It first flows n.w. to Civray, where it turns southward into the department of Charente to Angoulême, thence it flows westward past Châteauneuf, Jarnac, and Cognac, and entering Charente-Inférieure, it runs

n.w. past Saintes, and falls into the Atlantic below Rochefort, and opposite the islands Oléron and Aix. This river gives its name to two departments, both remarkable for the productiveness of their vineyards; but the wines are mostly used in the preparation of brandy and liquors.

**CHARENTE**, a department of France, formed chiefly out of the old province of Angoumois, and situated in lat.  $45^{\circ} 10'$  to  $46^{\circ} 8' N.$ , and long.  $0^{\circ} 50' E.$  to  $0^{\circ} 30' W.$  Area, about 2294 sq. miles. Pop. '96, 356,236. It is generally hilly, and is watered by the river Charente, above noticed, and its tributaries, the Tardouère and the Bandial, with the rivers Vienne and Dronne.

**CHARENTE-INFÉRIEURE**, a maritime department of France, which includes the former province of Angoumois, with the greater part of Saintonge, and a small portion of Poitou. It lies in lat.  $45^{\circ} 5'$  to  $46^{\circ} 19' N.$  and long.  $0^{\circ} 7' E.$  to  $1^{\circ} 13' W.$  The bay of Biscay washes its western boundary—the coast-line, which is very broken, measuring about 100 miles. Area, 2835 sq. miles. Pop. 453,455. It is watered on its boundaries by the Sèvre-Niortaise and the Gironde, and in the center by the navigable Charente and the coast-stream Sendre. The surface is level; and the soil—near the coast, intersected by ridges of rock and sand-banks, and protected from the sea by dikes—is mostly chalky and sandy, but very fertile, producing hemp, flax, saffron, and wine in great quantities. The commerce, facilitated by the structure of the coast, and by canals in the interior, is considerable, consisting chiefly of brandy and sea-salt, which is found in the department in great abundance. The oyster and pilchard fisheries are important. The chief harbors are those of Rochefort and La Rochelle, the latter of which is the chief town. C. is divided into the six arrondissements of La Rochelle, Rochefort, Marçennes, Saintes, Jonzac, and St. Jean-d'Angely.

**CHARENTON-LE-PONT**, a t. of France, in the department of Seine, situated on the right bank of the Marne, 5 m. s.e. of Paris. The bridge over the river, which is important from a military point of view, being considered one of the keys of the capital, and which has frequently been the scene of conflicts, is defended by two forts, forming a part of the fortifications of Paris. At the other side of the river is the national lunatic asylum, formerly called Charenton St. Maurice, and now St. Maurice simply. Pop. '91, 15,306.

**CHARES**, 4th c. B.C., an Athenian general who relieved the Philasians from the siege of the Argives and Arcadians; fought against Oropus; lost the island of Corcyra to Athens; commanded jointly with Chalcas in the social war, and made a successful attack upon Chios, in which Chalcas was killed; led an expedition against and captured Sestos; commanded in Thrace, where his main business was private plundering; and in 338 was one of the Athenian commanders in the battle of Chæronea.

**CHARES**, a Grecian artist in bronze, a native of Lindus, and the designer of the Colossus of Rhodes, lived in the 8d c. B.C. He was a pupil of Lysippus.

**CHARGE**, in electricity. See **ELECTRICITY**, **STATIC**.

**CHARGE**. In the law of Scotland, a C. is a command to perform an act, conveyed in the letters of the sovereign. The same term is applied to a messenger's copy for service, requiring the person to obey the order contained in the letters.

**CHARGE**, in heraldry. The figures represented on a shield are called charges, and a shield with figures upon it is said to be charged (Fr. *chargé*). The charges in a shield ought to be few in number, and strongly marked, both as regards their character and the mode of their representation. The family shield, belonging to the head of the house, almost always is simpler, i.e., has fewer charges, than the shields of collaterals, or even of junior members.

**CHARGE**, in military pyrotechny, is sufficient combustible material for one firing or discharge. It is applicable to all kinds of frings, fireworks, and explosions; but the name is generally given to the quantity of gunpowder requisite for firing off a gun, etc. In cannon, this varies greatly, from  $\frac{1}{4}$  to  $\frac{1}{2}$  of the weight of the shot; some of the rifled ordnance now coming into use are remarkable for the smallness of the C. with which they are fired. The quota of C. will be mentioned in connection with the various kinds of fire-arms described in the *Cyclopædia*. In breaching a wall, a greater C. is necessary than in attacking a ship or a column of troops, even with the same kind of gun and projectile.

**CHARGÉS D'AFFAIRES** are fourth-class diplomatic agents, accredited, not to the sovereign, but to the department for foreign affairs; they also hold their credentials only from the minister, and are sometimes only empowered by an ambassador to act in his absence.

**CHARIOT**, in ancient times, was a kind of carriage used either for pleasure or in war. According to the Greeks, it was invented by Minerva; while Virgil ascribes the honor to Erichthonius, a mythical king of Athens, who is said to have appeared at the Panathenaic festival founded by him, in a car drawn by four horses. The ancient C. had only two wheels, which revolved upon the axle, as in modern carriages. The pole was fixed at its lower extremity to the axle, and at the other end was attached to the yoke, either by a pin or by ropes. The Greeks and Romans seem never to have used



more than one pole, but the Lydians had carriages with two or three. In general, the C. was drawn by two horses. Such was the Roman *biga* (q.v.), but we also read of a *triga*, or three-horse C., and a *quadriga*, or four-horse one. The last was that in which the Roman generals rode during their triumphal entrance into the city, and was often adorned with splendid art. The war-chariot held two persons—the soldier himself and the driver, the latter of whom usually occupied the front; but the chariots used by the Romans in their public games held only the charioteer.

The oldest war-chariots of which we read are those of Pharaoh (Exodus xiv. 7). All the eastern nations used them, while we learn from Caesar (*De Bell. Gall.*, v. 19) that the Britons also were familiar with their use. See *illus. EGYPT*, vol. V.; *ARCHAEOLOGY*, vol. I.; *NINEVEH AND ASSYRIA*, vol. X.

**CHARIST'CARIES**, officers (in Greek ecclesiastical history) who had full power over the revenues of hospitals and monasteries.

**CHARITABLE USES OR TRUSTS AND LAW OF CHARITIES.** A trust for charitable uses, or public trust, has been defined as "A gift, to be applied consistently with existing laws, for the benefit of an indefinite number of persons, either by bringing their hearts or their minds under the influence of education or religion, by relieving their bodies from disease, suffering, or constraint, by assisting them to establish themselves in life, or by erecting or maintaining public buildings or works, or otherwise lessening the burdens of government." It is distinguished from private trust, which includes all other trusts, in that: I., It always exists for charity or public beneficence; II., Its beneficiaries are indefinite and undetermined, and III., It may and usually does create a perpetuity.

I. An enumeration of the charitable objects, for which such trusts may be created and upheld, is found in an English statute passed in the 43d year of Elizabeth. Those objects may be grouped, as appears by the definition given, under four general heads, as follows: (1) Gifts for *strictly eleemosynary* objects, i.e., for charity in its narrow, popular sense, such as gifts for the poor, for sick, disabled, or demented persons, and for hospitals, homes, and asylums. (2) Gifts for *educational purposes*, as for schools and colleges, to build or equip libraries, and to endow scholarships, fellowships, and the like. (3) Gifts for the purpose of *religion*, such as those for the building or repairing of churches, for missions, and for spreading the Gospel. (4) Gifts for *lightening the expenses of government*, such as bequests for the erection of public buildings, docks, wharves, canals, etc.

II. *Indefiniteness in the beneficiaries*, either as to the class to be benefited, or as to the individuals in a determined class who will be the objects of the bounty, is the predominant distinguishing feature of charitable uses or trust. If the beneficiaries be definitely specified, no matter how charitable the object of the gift, it constitutes a private trust and must be construed and governed accordingly. Thus, a trust for the support and comfort of designated persons in a certain hospital would be private, while a trust for all those who should be cared for by such an institution would be public or charitable. This feature of trusts for charity, coupled with the liberal spirit in which courts construe such gifts, has led to the method of executing them, so called, *cy pres* ("as near as"). By this doctrine is meant, that when such gifts cannot be applied according to the precise intention of the donor they will be employed for a purpose as near as possible (*cy pres*) to that which was designated. It assumed two forms in England. In one form it was employed by the chancellor in the exercise of a prerogative, executive power, delegated to him under the sign manual of the Crown, and was carried to the extent of applying a trust for charities to *some* charitable purpose, even when the objects for which it was intended were illegal and void. In its other form, it was exercised by the chancellor in the performance of his *judicial* functions, and was applied only to such charitable trusts as were legal and valid in their inception, but which, because of some change in law or circumstances, could not be carried out in exactly the manner indicated by the donor. In this latter form, but not in the former, the *cy pres* doctrine is recognized and applied in some, though not in all, of the American states, where trusts for charity are allowed. For example, a bequest made before the fall of slavery in the United States, to trustees to be applied to various methods of creating a sentiment against negro slavery in America was applied, after the close of the civil war, by the Massachusetts courts, to the American Freedmen's Union Commission; and in Missouri, trustees having been directed by will to establish *forever* a charitable home upon land devised to them, and a portion of the land having been cut off from the residue by a new street and rendered useless for the building, that portion was ordered by the court to be sold and the proceeds applied to the payment of the debts of the same institution.

III. A trust necessarily suspends, during its continuance, the power of free and unrestrained alienation of property. It is, therefore, restricted by the common law principle and prevalent statutory provisions, which forbid such suspension except for a limited time measured by the lives of one or more individuals. A suspension beyond such a period is known as a *perpetuity*. But, property donated to trustees for charitable purposes may remain in the hands of such trustees for all time, notwithstanding the fact that the absolute power of alienation is thus indefinitely suspended.

Gifts for charitable uses are of considerable antiquity. They were probably known and fostered by the Christian emperors of Rome. They were recognized and enforced by the English court of chancery long before the statutes of 39 and 49 Elizabeth, but by

those statutes they were defined and greatly promoted. In England, the "Charitable Trusts Acts" (passed in 1853, 1855, 1860, and 1869), have formed a species of code of the law of charities and completely changed the method of administering such trusts. In the United States, the statutes of Elizabeth have not been re-enacted; but in many of the states charitable uses are recognized and enforced by the judiciary. In others, as New York, trusts for charity are placed upon the same footing as private trusts.

**CHARITON**, a co. in n. central Missouri, lying n. and e. of the Missouri and w. of Grand river, and intersected by the Wabash railroad; 740 sq. m.; pop. '90, 26,254, includ. colored. The surface is rolling prairie and forest, with fertile soil. Coal and limestone are found. Chief productions, agricultural. Co. seat, Keytesville.

**CHARITON**, the author of a romance entitled *The Loves of Chereas and Cullirrhoe*, written in Greek about the fourth century, A.D. He is said to have been a native of Aphrodisias in Caria, Asia Minor. Nothing is known about his personal history.

**CHARITON**, or **GRAND CHARITON**, a river rising in s. central Iowa, and flowing s.e. into Missouri, thence s., joining the Missouri river in Chariton co.; 250 m. long, and navigable about 50 miles.

**CHARITY, BROTHERS OF**, were a religious order of the Roman Catholic Church, founded at Seville, Spain, in 1540, by St. John of God who in this year began to receive the sick into his house, and to gather about him others who were interested in works of charity and love. The Archbishop of Seville gave the new association his official approval, as did the Pope at a later date. The members of the Order had no distinctive dress until in 1573, Pope Pius V. gave it the habit of the Augustines. The members of the Order were often very skillful in surgery and medicine; and established hospitals and infirmaries in both France and Italy. The Society became almost extinct upon the Continent of Europe in the last century, being superseded by the Sisters of Charity; but in 1828 it was revived in England by Cardinal Rosmini-Serbatì.

**CHARITY, SISTERS OF**. An organization founded at Châtillon in 1633 by St. Vincent de Paul and a French lady, Mme. de Gras, with the object of caring for the poor, the infirm, and the sick, and for the education of young children. The institution was formally approved by the Archbishop of Paris in 1655, and free schools, hospitals, almshouses, and prisons were placed under their especial charge. The order soon had representatives in other countries, and in 1660 was approved by the Pope. Under the First Empire, Napoleon placed the Sisters under the protection of his mother. The vows taken are simple and renewed every year. In the United States, the Congregation first maintained a branch in 1809, when Mrs. Eliza Ann Seton established a foundation at Emmetsburg, Md. There are more than 175 houses of this noble Sisterhood in this country.

**CHARIVARI** is a French term used to designate a wild tumult and uproar, produced by the beating of pans, kettles, and dishes, mingled with whistling, bawling, groans, and hisses, and got up for the purpose of expressing a general dislike to the person against whom it is directed. The etymology of C. is obscure; the Germans translate it by *Katzenmusik*, the English of which is *cat-scauling*. In France, during the middle ages, a C. was generally raised against persons contracting second nuptials, in which case the widow was specially assailed. On these occasions, the participants in it, who were masked, accompanied their hubbub by the singing of satirical and indecent verses, and would not cease till the wedding couple had purchased their peace by ransom. C. answers to the English concert upon "marrow-bones and cleavers," with which it was customary to attack a married couple who lived in notorious discord. It was also got up against an unequal match, such as where there was great disparity in age. See SKIM-MERTON.

Similar customs seem to have existed under different names in all parts of Europe, and sometimes they were of such a licentious and violent character as to require military interference to put them down. Even as early as the 14th c., the church found itself forced to threaten punishment, and even excommunication, against those who participated in them. In more recent times, the C. has taken a purely political coloring; as, for example, during the restoration in France, at which time, however, the popular voice began to seek vent by casting its satirical darts against public men through the press. The papers published for this purpose were called C., the most famous among which is the *Charivari*, which was established in Paris, Dec. 2, 1832, corresponding to the English publication, *Punch* (q.v.).

**CHARKOV**. See KHARKOV.

**CHARLATAN**, a mountebank, quack-doctor, or empiric, and hence any one who makes loud pretensions to knowledge or skill that he does not possess. The word seems to be derived from the Ital. *ciarlare*, to babble or talk, the chief art of the C. consisting in talk. Charlatanism abounds in all departments of life, and manifests itself in various ways according to the subject and character of the person. It changes also in form with the spirit of the time. The medical C. no longer appears on a stage in the guise of Dr. Ironbeard, but as a fine-dressed gentleman, receiving grateful acknowledgments through the newspapers, and publishing popular medical books, with the address of the author, and recommendations to apply to him. It has not unfrequently happened, however, that extraordinary men who were so far before their age as not to be understood by it, such as Paracelsus, have passed for charlatans until more justly esti-

mated by later times. Several books have been written on the charlatanism of scholars. J. B. Mencke's satire, *De Charlataneria Eruditorum* (Leip. 1715), is a classical work, which has been continued by Büschel in his book, *Ueber die Charlatanerie der Gelehrten seit Mencke*.

**CHARLEMAGNE**, i.e., Charles the Great, king of the Franks (768-814 A.D.), and Roman emperor (800-814 A.D.), was b. on 2d April, 742, probably at Aix-la-Chapelle, and was the son of Pepin the Short, the first Carolingian (q.v.) king of the Franks, and grandson of Charles Martel (q.v.). On Pepin's death in 768, he and his brother Carloman jointly succeeded to the throne. By Carloman's death, and the exclusion of both his sons from the throne, C. became sole king. In 772, it was resolved in the diet at Worms to make war against the Saxons, for the security of the frontiers, which they continually threatened, and for the extension of the Christian religion. C. advanced as far as the Weser in 772, securing his conquests by castles and garrisons. Pope Adrian I. now called him to his aid against Desiderius, king of the Lombards. C. had married the daughter of Desiderius, and had sent her back to her father because she bore him no children, and married Hildegard, daughter of the Swabian duke, Godfrey. Desiderius had sought revenge by urging the pope to crown the sons of Carloman, and on the pope's refusal, had laid waste the papal territory. C. crossed the Alps from Geneva, with two armies, by the Great St. Bernard and Mont Cenis, in 773, and overthrew the kingdom of the Lombards in 774. The Lombard dukes acknowledged him as their king, and he secured the pope's favor by confirming the gift which Pepin had made to the papal see, of the exarchate of Ravenna. In 775, he was again employed in the most northerly part of his dominions, reducing the Saxons to subjection; in 776, he suppressed an insurrection in Italy; in 777, he so completed his victory over the Saxons, that their nobles generally acknowledged him as their sovereign in an assembly at Paderborn. Being now invited to interpose in the wars of the Arabs and Moors in Spain, he hastened to that country in 778, and added to his dominions the regions between the Pyrenees and the Ebro. From Spain he was summoned in haste by a new insurrection of part of the Saxons, who had advanced almost to Cologne, but whom he drove back to the Elbe. In 781, he went to Italy, where the pope crowned his second son, Pepin, king of Italy, and his third son, Louis, an infant of three years old, king of Aquitaine. The Saxons once more rising in arms, defeated and destroyed a Frankish army on the Sünfel in 782, which C., after a new victory, fearfully revenged by causing no fewer than 4500 prisoners to be executed as rebels in one day. A more general rising of the Saxons followed, but in 783-85, the Frankish monarch succeeded in reducing them completely to subjection, and in persuading their principal chiefs to submit to baptism, and to become his faithful vassals. Subsequent insurrections and wars in Germany, between this year and 800, resulted in victories over the Bulgarians and Huns, and in the further consolidation and extension of his empire, the eastern boundary of which now reached to the Raab.

In 800, C. undertook an Italian campaign, which was attended with the most important consequences. Its immediate purpose was to support pope Leo III. against the rebellious Romans. When C., on Christmas day, 800, was worshipping in St. Peter's Church, the pope unexpectedly, as it appeared, set a crown upon his head, and, amidst the acclamations of the people, saluted him as Carolus Augustus, emperor of the Romans. Although this added nothing directly to his power, yet it greatly confirmed and increased the respect entertained for him, such was still the lustre of a title with which were associated recollections of all the greatness of the Roman empire. A scheme for the union of the newly revived western empire with the empire of the east, by C.'s marriage with Irene (q.v.), the Byzantine empress, failed by reason of Irene's overthrow. After this, C. still extended and confirmed his conquests both in Spain and in Germany. He labored to bring the Saxons to a general reception of Christianity, and founded bishoprics for this purpose. To the end of his reign, he was incessantly engaged in wars, and insurrections were always apt to break out in the frontier parts of his dominions; which he endeavored to secure, however, not only by military power and arrangements, but by improvements in political and social institutions. His views were liberal and enlightened to a degree rare for many subsequent ages. Whilst he made the power of the central government to be felt to the utmost extremities of his empire, he recognized in his subjects civil rights, and a limitation of monarchic power by their assemblies. He zealously endeavored to promote education, agriculture, arts, manufactures, and commerce. He projected great national works, one of which was a canal to connect the Rhine and the Danube; but he deemed nothing beneath his attention which concerned the interests of his empire or of his subjects. He required his subjects to plant certain kinds of fruit-trees, the cultivation of which was thus extended northward in Europe. His own domains were an example of superior cultivation. He had a school in his palace for the sons of his servants. He built sumptuous palaces, particularly at his favorite residences, Aix-la-Chapelle and Ingelheim—for he had no fixed capital—and many churches. Learned men were encouraged to come to his court. He himself possessed an amount of learning unusual in his age; he could speak Latin and read Greek. He attempted to draw up a grammar of his own language. C. was of more than ordinary stature, and of a noble and commanding appearance. He was fond

of many exercises, particularly of hunting. He was too amorous, but in eating and drinking he was very moderate. His fame spread to all parts of the world: in 768, Harun-al-Raschid sent ambassadors to salute him. He enjoyed good health till shortly before his death, 28th Jan., 814. He was buried at Aix-la-Chapelle (q.v.), in a church which he had built there. He was succeeded by his son Louis, styled Louis le Débonnaire, the only one of his sons who survived him; but the greatness of his dynasty terminated with his own life. C. is styled Charles I. in the enumeration both of the French kings and of the German or Roman emperors. Besides his *capitularies* (q.v.), there are extant letters and Latin poems ascribed to him. His life was written by his secretary, Eginhard.

**CHARLEMONT.** See GIVET.

**CHARLEROI**, a Belgian t. and fortress in the province of Hainaut, stands on the Sambre, between Mons and Namur, on the line of the Brussels and Namur railway. The pop. is (1890) 21,879, who carry on considerable manufactures in hardware, glass, woolen-yarn, etc. The district is rich in coal, and the number of smelting-furnaces and nail-factories in the neighborhood is very great. The ironworks of Couillet, which yield a third of all the cast-iron produced in Belgium, lie within a mile or two of the town. C. possesses considerable historical and political interest as a fortress. The fortifications were begun by the Spaniards in 1666, but falling into the hands of the French next year, they were completed by Vauban. After six exchanges of masters between the French and Spaniards, the peace of Aix-la-Chapelle, 1748, left C. in the possession of Austria. In 1794, after a protracted and desperate resistance, it was surrendered to the French by capitulation, when the fortifications were demolished. The importance of the place in a strategic point of view having become apparent during the campaign of 1815, the fortifications have been since restored.

**CHARLES**, a co. in s.w. Maryland, between the Potomac and Patuxent rivers; 460 sq.m.; pop. 15,191, incl. colored. Surface uneven, with forests of locust, oak, ash, chestnut, and cedar. Tobacco is the main production. Co. seat, Laplata.

**CHARLES I.**, King of England, Scotland, and Ireland (1625-49), was b. at Dunfermline, 19th Nov., 1600, and was the second son of James I. of England (VI. of Scotland). On the death of his elder brother, Henry, in 1612, he became prince of Wales, and heir-apparent to his father's throne; to which he succeeded in 1625, but found both in England and Scotland a contest in progress between king and people. He had inherited from his father the most extreme notions of kingly prerogative, and he mistook the general movement in the public mind for an agitation amongst a few disaffected persons. He had deeply imbibed his father's notion, that an Episcopal church was the most consistent with the proper authority of kings; and he adopted severe and persecuting measures against the Puritans in England and the Presbyterians in Scotland. He married a Roman Catholic, Maria Henrietta of France, a marriage most displeasing to the nation; and even so far despised public opinion as to make his father's favorite, the duke of Buckingham, his prime minister and chief adviser. The English parliament, which he assembled in 1625, was resolved upon the vindication of the national liberties, and was therefore very sparing in its grants of subsidies, while that of 1626, instead of freely granting supplies, resolved upon the impeachment of Buckingham; whereupon the king threw into prison two of the boldest members, Elliot and Digges; dissolved parliament; and, to procure money, had recourse to the arbitrary measures of forced loans, and a tax upon the seaports (*ship-money*), imposed by the mere exercise of royal authority. By all this, public feeling was more and more embittered. In 1628, C. found it necessary again to summon a parliament; and the parliament, very resolute to maintain the liberties of the nation, presented the petition known in history as the *Petition of Rights* (q.v.). C. temporized, conceded, and finally, although the assassination of Buckingham had removed one cause of strife, assumed a threatening tone, and dissolved the parliament, 10th Mar., 1629. He even caused some of the leading members of the house of commons to be imprisoned. He now governed for 11 years without a parliament, having Laud (q.v.) and Strafford (q.v.) for his chief advisers, and obtaining for his edicts the semblance of a legal sanction by means of the star chamber (q.v.). All this while, the storm was gathering, the love of liberty increased, and republican principles were developed and extended. The policy which C. adopted was that of more severe repression. At length, in 1638, Scotland assumed an attitude of determined resistance to the imposition of a liturgy and of Episcopal church-government. The national covenant (q.v.) was subscribed, Presbyterianism was completely restored; and in 1639, the king having assembled an army for the purpose of reducing Scotland to subjection, the Scottish covenanters also took up arms, and advanced to the English border, many of the English regarding their approach with joy. Civil war was, however, prevented for the time, by concessions on the part of the king. Unable to do without supplies any longer, C. summoned an English parliament in 1640, which, instead of listening to his demands, began to draw up a statement of public grievances. C. soon dissolved the parliament, and assembled an army to resist the Scots, who had again taken up arms and entered England; but his army was defeated by them at Newburn-upon-Tyne, and they advanced southward, with the sympathy and good wishes of no small part of the king's English subjects. Much against his will, C. was now compelled again to call a parlia-

ment, whose memorable sittings began on 8d Nov., 1640. Both houses were resolute in their opposition to his despotism. They began by the impeachment of the ministers and high officers of state, and declared the decrees of the star chamber and court of high commission to be null and void. They passed a bill in favor of triennial parliaments; and the king, in trepidation, gave it his assent. He also consented, although against his own convictions, to the execution of Strafford; and even gave his assent to an act which provided that the present parliament should not be dissolved, prorogued, or adjourned, without its own consent. Hoping to win the favor of the Scots, he now visited Scotland; but whilst he was there, a rebellion broke out in Ireland, accompanied with a fearful massacre of Protestants. The prospect of a peaceful accommodation was now almost destroyed; the English parliament enlarged its demands; the king, after seeming to yield, took the extraordinary step of suddenly, on 4th Jan., 1642, appearing in the house of commons, accusing five members—Pym, Hampden, Hollis, Hazell, and Stroud—of high treason, and demanding that they should be delivered up to him. Both houses of parliament espoused their cause, and the city of London showed a determination to defend them by arms. C. left London with his family, and the parliament declared the kingdom in danger. Civil war began; the royalists had at first the advantage, but the national feeling was with the parliament. Negotiations were from time to time opened or renewed, but always in vain. After the battle of Naseby, on 15th June, 1645, in which his army was almost annihilated by the parliamentary troops under Fairfax and Cromwell, C. was compelled to seek refuge in the Scottish camp. Negotiations still proving fruitless, he was delivered up to the English parliamentary army. Negotiations were still attempted with C. in his captivity; but resulted in nothing. Finally, C. fled, was taken, refused the ultimatum of the army, and so enraged Cromwell and the Independents, that parliament was obliged to pass an act declaring all negotiation with the king to be treason. The Presbyterians of England and the Scots, who were always haunted by the idea that there was something sacred and inviolable in monarchy, thought to rescue the king from the hands of the Independents, but were defeated, and all the Presbyterians were forcibly expelled from the English house of commons, which now consisting only of about 60 members—the *Rump parliament*—appointed a court composed of persons from the army, the house of commons, and the city of London, to try the king. The court was opened with great solemnity in Westminster hall on 20th Jan., 1649. About 70 members took part in its proceedings. On the 27th of Jan., C. was condemned to death as a tyrant, murderer, and enemy of the nation. The Scots protested, the royal family entreated, and the court of France and states-general of the Netherlands interceded, but in vain. On 30th Jan., 1649, he was beheaded in front of the palace of Whitehall. In his last hours he showed great calmness and presence of mind. In his private character, C. was a man of cultivated mind, kind, and of irreproachable life; but in political affairs he was unscrupulous, and had recourse to dissimulation and falsehood for the accomplishment of his purposes. In the estimation of many who do not condemn it on moral grounds, his execution was a great political blunder. From the restoration of Charles II., the 30th of Jan. was observed in the church of England with special religious services, as the day of *King Charles the Martyr*. This commemoration, offensive to great part of the community, and of the members of the established church itself, was abolished by act of parliament in 1859.

**CHARLES II.**, King of England, Scotland, and Ireland (1649–85), the eldest son of Charles I., was b. 29th May, 1630, and went with his mother to France during the civil war. He was at the Hague at the time of his father's execution, and immediately assumed the title of king. He meditated an expedition to Ireland for the assertion of his claims, when the Scots offered him their crown in 1650, and proceeding to Scotland, he was crowned at Scone in the beginning of 1651. The limitations, however, under which he received the crown, were disagreeable to him, and he hated the restraint put upon his inclinations by the Presbyterian clergy. After the defeat of the Scots at Dunbar, he put himself at the head of their army, in hope of rousing the royalists of England to his support; but was completely defeated by Cromwell, at Worcester, on 3d Sept., 1651. He made his escape, amidst many dangers, to France, where his situation was by no means agreeable, and from which he went to Cologne, and afterwards to the Netherlands. After Cromwell's death, the desire of the English for a settled government leading to the restoration of the house of Stuart, he landed at Dover, on 26th May, 1660, was received with acclamation by the people, and ascended the throne almost untrammelled by a single condition. He was surrounded by men of extreme party-feeling, among whom the most influential was the chancellor, Clarendon (q.v.). The persons immediately concerned in the death of Charles I. were brought to the scaffold; Episcopacy was restored; and the Presbyterians and other non-conformists, both in England and Scotland, were subjected to great hardship and persecution. The king was extravagant, and soon found himself in want of money: he married the princess Catharine of Portugal, for the sake of her large dowry; he shamefully sold Dunkirk and Mardyke to the French; and for a pecuniary consideration, agreed to make war against the united provinces, although such a war was contrary to all the feelings of the English people and the interests of English commerce. The Dutch fleet, under De Ruyter,

entered the Thames, and C. was compelled to make an ignominious peace. After the fall of Clarendon, the ministry known as the Cabal (q.v.) ministry came into power—a ministry hateful to the country, composed of unprincipled men, and bent upon the restoration of popery and absolute monarchy. C. sought to conciliate the people by the *triple alliance*, in May, 1668, with Sweden and the states-general; but the French court soon found means to persuade him again to make war against the united provinces. He basely accepted pecuniary gifts and a pension from the French government; and, as even this, with all that he could get from his parliament, was insufficient for his expenses, he had recourse to illegal means of raising money. The story of the *popish plot* (see OATES) against the king's life caused prodigious excitement amongst the people, and lord Stafford and many other persons were most unjustly brought to the scaffold. The parliament of 1679, very much against the will of the court, enacted the celebrated *habeas corpus act* (q.v.); and a bill was under consideration for the exclusion of the king's brother, the duke of York, from the throne, on account of his avowal of the Roman Catholic religion. The king, at this period of his reign, had, however, completely crushed the Presbyterians of Scotland, and was more absolute than any of his predecessors had been on either of the British thrones. Most arbitrary measures were adopted. The city of London was deprived of its privileges, because of the election of a sheriff disagreeable to the court. The *Rye-house plot* (q.v.), a widely-extended conspiracy, and in which the king's natural son, the duke of Monmouth (q.v.), was concerned, was discovered in 1683, and cost the lives of a number of persons, amongst whom were lord Russell and Algernon Sidney. C., however, appears to have recognized the necessity of a more liberal policy, when he was unexpectedly carried off by death, on 6th Feb., 1685. In his dying hours, he called in the assistance of a Roman Catholic priest, although he had not previously avowed his attachment to that religion. His reign was full of events dishonorable to his country, and of which he himself was generally the cause. His life was most dissolute; his adulteries, and the profligacy of his court, scarcely paralleled in British history. He had an affability, however, which won for him a certain sort of popularity.

**CHARLES I., THE BALD, 823-77**; King of France and emperor of the Romans, son of Louis le Debonnaire by his second wife, Judith. The father, in order to furnish C. a kingdom, took away portions of the territory of the other sons, and war among them followed, which ended in leaving C. in possession of a large kingdom in the w. part of the empire. When Louis died, C. undertook to succeed him as the emperor, and made an alliance with his brother Louis, the German. In 841, C. defeated his rival and eldest brother, Lothaire. In 843, the treaty of Verdun confirmed C. in possession of the kingdom, which comprised all France west of the Meuse, Saone, and Rhone, and Spain from the Ebro to the Pyrenees. But the government of C. was weak; the Norsemen pillaged the country almost without resistance; and finally the people, in despair of relief, called in the aid of his brother Louis, who drove C. from the country for a time. But C. had the church on his side, being entirely under control of the bishops, and in 875 he was crowned emperor by the pope. Louis was too strong for him, however, and he never to any great extent recovered his power. He died in 877, near mont Cenis, while on his way against the Saracens at the request of the pope.

**CHARLES II., THE FAT, 832-88**; King of the Franks and emperor of the Romans, third son of Louis the German. From his father, C. inherited Swabia; in 880, the death of his brother Carloman of Bavaria made him king of Italy; in 881, he was crowned emperor; the death of Louis of Saxony in 882, also a brother, brought him all Germany; and that of Carloman, the French king, in 885, left him all France; and so by no effort of his own, but by natural causes solely, C. became sovereign of all the dominions of Charlemagne. But he was a weak, gluttonous creature, more intent upon the pleasures of the table than upon matters of state. The Norsemen sailed up the Seine and laid siege to Paris, and C., instead of making even an attempt at resistance, bought them off with 700 pounds of silver and a free passage to the upper Seine and Burgundy, where they might ravage at will. In 887, C. was deposed by his people, and died the next year in a cloister.

**CHARLES III., THE SIMPLE, 879-929**; King of France; posthumous son of Louis the Stammerer. By the death of his rival, Charles the Fat, in 887, he obtained possession of the whole kingdom. The most conspicuous act of his reign was the cession to the harassing Norsemen of the territory afterwards known as Normandy, on condition that the heathen should be baptized, that Rollo (Hrolf Ganger, or Ralph the Walker, a Danish pirate chief, and the ancestor of William the Conqueror, of England) should marry Charles's sister, and become a duke and vassal of the crown. In 922, the barons rebelled against Charles, and elected Robert, brother of the previous king, in his place; but Robert was killed by Charles's own hand in the battle of Soissons, though that did not secure to him the victory. The barons then chose for King Raoul, duke of Burgundy. After many failures, misfortunes, and a long imprisonment, Charles died at Peronne.

**CHARLES IV., THE FAIR, 1294-1328**; King of France and Navarre; third son of Philip the Fair, succeeded his brother Philip V., in 1322. The chief purposes of his policy were to free the country from the Lombards, and from the exactions of the barons.

and the judges. He also did something towards improving the condition of the Jews, and assisted his sister Isabella in her contest with her husband, Edward II. of England. In 1325, being supported by the pope, Charles made an unsuccessful effort to attain the imperial crown.

**CHARLES V.**, surnamed **THE WISE**, King of France (1364-80), was the son of king John, and was b. on 21st Jan., 1337. His father being made prisoner by the English at the battle of Poitiers, on 19th Sept., 1356, he assumed the regency. The most significant events which occurred under his rule, were the vigorous efforts of the *bourgeoisie* to deliver themselves from the tyranny of the nobles and the court, and the peasant war called the *Jacquerie* (q.v.). His father dying, 8th April, 1364, C. ascended the throne, and by his cautious policy rescued the kingdom from some of its troubles, and re-established the power of the crown, which had been much shaken. War with England raged for a number of years, but with results highly favorable to C., who stripped his enemies of all their conquests in France, except a few fortified places. He died 16th Sept., 1380. C. was fond of books and the company of learned men, but was not above the natural weakness of kings for outward pomp and magnificence.

**CHARLES VI.**, King of France (1380-1422), b. at Paris, 8d Dec., 1388, was the son and successor of Charles V. He was only 13 years of age when his father died. For several years, his uncle, the duke of Anjou, acted as regent. In 1388, C. took the reins of government into his own hand, but during his life-time was so often afflicted with insanity, that party strife raged without much check. The two great families whose influence divided the nation, were those of Orleans and Burgundy. It was the Orleans party which called in the assistance of the English, and brought about the battle of Agincourt, so disastrous to the French nation. Subsequently the Burgundians allied themselves to the English, who laid waste the whole of northern France. In the midst of these calamities, C. died, 21st Oct., 1422.

**CHARLES VII.**, King of France (1422-61), the son and successor of Charles VI., was b. on 22d Feb., 1403. On his father's death he was at the head of an army, with which he held possession of the southern provinces of the kingdom; Paris and the north being in the hands of the English, who proclaimed Henry VI. of England king of France, and appointed the duke of Bedford regent. For some time the events of war were unfavorable to C., who was compelled, in 1424, to evacuate Champagne, and, in 1425, Maine. In 1436, the count Dunois gained the first victory over the English at Montargis; but in the year following they besieged Orleans, a place of great importance to C., as securing a connection with the north, and he was roused to fresh energy. At this time, also, Joan of Arc (q.v.), the maid of Orleans, by her wonderful courage and confidence of a heavenly mission, roused the fervor both of nobles and people. The siege of Orleans was raised in May, 1429; the English retired disheartened, and gradually lost their acquisitions in France. A treaty between the French king and the duke of Burgundy greatly advanced the French cause. In 1436, C. entered Paris; and during the further progress of the war, the English lost all their strongholds except Calais. In 1452, they were finally defeated at Castillon. After he was established on his throne, C. devoted himself to the reorganization of the government, in which everything had fallen into confusion, but showed a strong anxiety to frame it according to a scheme of perfect despotism, and for this purpose to provide himself with a powerful and well-disciplined standing army, which caused some discontentment among the nobles of his kingdom. His government, however, was mild, and under it France recovered in some measure from the effects of the terrible calamities which it had endured. His last years were embittered by the conduct of his son, the dauphin, afterwards Louis XI.; and his apprehension that his son would poison him was so strong, that his consequent abstinence from food is supposed to have hastened his death, which took place at Melun on 23d July, 1461.

**CHARLES VIII.**, King of France (1483-98), was b. at Amboise on 30th June, 1470, and succeeded to the throne on the death of his father, Louis XI. For some time the government was carried on under the regency of his sister, Anne of Beaujeu. When C. attained his 21st year, he took the royal power into his own hand, and soon developed a bold and ambitious spirit. The most important incident of his career was his conquest of Naples in 1495, to the throne of which he believed he had a claim. The Italian princes and other European potentates were alarmed by his success. A league was hastily formed between the pope, the emperor of Germany, Ferdinand of Spain, the republic of Venice, and Sforza, duke of Milan, to oppose his return to France. C., however, gallantly broke through the allied forces near Piacenza, and effected a retreat to his own country. It was with difficulty he was hindered by his councilors from resuming his warlike designs on Italy. C. is also said to have meditated the expulsion of the Turks from Europe, and making himself emperor of Constantinople; having received from Andreas Palæologus, the grandson of the last Grecian emperor, a transference of his claims to the Byzantine throne. He died 7th April, 1498.

**CHARLES IX.**, King of France (1560-74), the second son of Henry II. and of Catharine de Medici (q.v.), was b. at St. Germain-en-Laye on 27th June, 1550, and on 5th Dec., 1580, succeeded to the throne on the death of his brother, Francis II. His char-

acter was a compound of passion, acuteness, heartlessness, and cunning. Although only 24 years of age when he died, so well had his detestable mother trained him to a love of perfidy and cruelty, that he found time, with her assistance and that of the Guises, to perpetrate an act so hideously diabolical, that all civilized Europe still shudders at the recollection. The massacre of St. Bartholomew's (q.v.), 24th Aug., 1572, was the culmination of a series of treacheries towards the Huguenots, which disgraced his reign. The result was, that civil war broke out anew, and assumed a very threatening character, as political malcontents associated themselves with the Protestants. C. died May 30, 1574.

**CHARLES X.**, King of France (1824-30), third son of the dauphin Louis, and grandson of Louis XV., was b. at Versailles, 9th Oct., 1757. He received the title of count d'Artois, and in 1778 married Maria Theresa of Savoy. After the events of 14th July, 1789, he and the prince of Condé took the lead of the emigration. In 1796, he sailed from England with a squadron under commodore Warren, on an expedition to the western coasts of France, whereupon twenty departments rose in insurrection; but he had not courage to land and place himself at the head of the insurgents, whom he basely left to the vengeance of the republicans. Detested now by the royalists of France, and despised by the British, he lived in obscurity until the allies entered Paris in 1814, when he appeared in France as lieutenant-general of the kingdom, and issued a proclamation announcing the end of despotism, of conscriptions, and of oppressive taxes. After the second restoration, he took little open part in politics, but lived surrounded with priests, Jesuits, and nobles of the old school; and in this circle originated the tyrannical and unconstitutional measures to which even Louis XVIII. made considerable opposition, but which at this time disgraced the government of France. The death of Louis, on 16th Sept., 1824, brought C. to the throne. He took the oath of adherence to the charter, but soon displayed his intention of restoring as much as possible the absolutism of the old French monarchy. Popular discontent rapidly increased. A royal speech, of a threatening character, on 2d Mar., 1830, was followed by an address of remonstrance, signed by 221 deputies, upon which the king dissolved the chambers. The deputies who signed the address were all re-elected, but the court taking fresh courage from the success of the expedition to Algiers, the celebrated ordinances of 25th July were signed by the king, putting an end to the freedom of the press, already largely curtailed, appointing a new mode of election, and dissolving the recently elected chamber. The capital took up arms, the guards refused to act, and the king soon found himself compelled to flee. As a last resource, he abdicated the throne, on 2d Aug., 1830, in favor of his grandson, Henry, duke of Bordeaux, the dauphin also consenting to this act. But it was too late; the revolution was accomplished, and Louis Philippe, duke of Orleans, was chosen king of the French. C. made his escape to England, resided for some time at Holyrood, and afterwards at Prague. He took no part in the political intrigues and attempts of the duchess de Berri. He died of cholera at Götz, on 6th Nov., 1836. His last surviving descendant, in the male line, was his grandson, the count of Chambord (q.v.).

**CHARLES IV.**, German emperor (1346-78), was b. at Prague in 1316, and was the son of king John of Bohemia, of the house of Luxembourg, who fell in the battle of Crécy. At the instigation of Pope Clement VI., to whom he had previously taken an oath of humiliating submission at Avignon, he was elected emperor by a portion of the electors on 11th July, 1346, although Louis IV. then actually filled the imperial throne. But even after the death of Louis, it was not without difficulty that he obtained secure possession of it. He was crowned king of Italy at Milan in 1354, and emperor at Rome in 1355. In 1356, he issued the golden bull (q.v.), the fundamental law concerning the election of German emperors; in defiance of the very letter of which he afterwards, by large bribes, secured for his own son, Wenceslaus, the succession to the empire. He died at Prague, 29th Nov., 1378. C. was an artful politician, but destitute of true greatness. He sought the support of the clergy by undue concessions, sold rights and privileges in Italy and other parts of the empire for money, and cared chiefly for the prosperity of his hereditary kingdom of Bohemia.

**CHARLES V.**, German emperor, was b. at Ghent on 24th Feb., 1500. He was the eldest son of Philip, archduke of Austria, and of Joanna, the daughter of Ferdinand and Isabella of Spain. Philip's parents were the emperor Maximilian and Maria, daughter and heiress of Charles the Bold, duke of Burgundy. On the death of his grandfather, Ferdinand, in 1516, C. took possession of the throne of Spain by the title of Charles I., his mother Joanna being of disordered intellect and incapable of reigning. He was not, however, very favorably received by the Spanish nobles, who were doubtful of his right, and jealous of the followers whom he brought from the Low Countries, where he had been educated. All the abilities of his famous minister Ximenes (q.v.) were requisite to prevent an open revolt. On the death of Maximilian in 1519, C. was elected German emperor from amongst a number of competitors, chiefly through the influence of the elector Frederic of Saxony. In his earlier years he had been frivolous and dissolute, but he now became mindful of the duties and dignity of his high position. On 22d Oct., 1520, he was crowned at Aix-la-Chapelle, and received from the pope the title of Roman emperor. He ascended the imperial throne at a



time when Germany was in a state of unprecedented agitation concerning the doctrines proclaimed by Luther. To restore tranquillity, a great diet was held at Worms in 1521, Luther's declaration of his principles before which forms a well-known and important passage in the history of the reformation. In 1522, he reduced to subjection the towns of Castile, which had leagued themselves together for the maintenance of their ancient liberties. He was likewise successful in his war against the Turks under Solymán the great. C. was involved also in a struggle of long duration with France, in which, after many alternations of fortune, his armies at last drove the French from the greater part of their conquests in Italy; and Francis I. of France fell into his hands as a prisoner, after a battle by which the siege of Pavia was raised on 24th Feb., 1525.

The pope, however, began to grow alarmed at his victories, and therefore allied himself with France and the principal Italian states, and released the king of France from the obligations under which he had come by his treaty with Charles. It was the pope's object to exclude C. from all dominion in Italy; but the emperor's forces under Charles of Bourbon, the former constable of France, took Rome itself by storm, plundered it, and made the pope prisoner. C. pretended great regret for this, went into mourning with all his court, and caused prayers to be said for the pope's liberation, whilst by his own directions the pope was kept for seven months a captive. Peace was concluded in 1529, on terms most favorable for the emperor. He now thought to put an end to the religious differences in Germany, and to repel the Turks, who had overrun Hungary and laid siege to Vienna. But the diet at Augsburg in 1530, proved how vain was the hope of restoring the former state of things in Germany; and the emperor refusing to recognize the confession of the Protestants, they refused to help him against the Turks. In 1531, the Protestant princes formed the league of Schmalkald (q.v.), and allied themselves with France and England for their own protection. This, and the continued assaults of the Turks, compelled the emperor to yield in some measure to the demands of the Protestants. In 1535, C. undertook an expedition from Spain against the pirate Barbarossa, who had established himself in Tunis, and whose vessels did prodigious injury to the commerce of Spain and Italy. In this expedition he was completely successful, and set free no fewer than 22,000 Christians, who had been held as slaves. War again broke out with France; an armistice for ten years was concluded in 1538; and C. even visited Paris, where he was magnificently entertained. But the war broke out afresh in 1542, and terminated in favor of the emperor; who also triumphed in the battle of Mühlberg, 25th April, 1547, over the Protestant princes of Germany, and deprived the elector John Frederic of Saxony of his territories. But he showed so plainly his intention of converting the German empire into a hereditary possession of his family, that new opposition arose, and C. was compelled to flee before the arms of duke Maurice of Saxony and the Protestants, and in 1552 to promise them the peaceful exercise of their religion, which was confirmed by the diet at Augsburg in 1555. Henry II. of France also took from C. some parts of Lorraine. His health failing, C. now declared, in an assembly of the states of Louvaine, his resolution to seek repose, and devote the remainder of his days to God. He resigned the government of his dominions to his son, for whom, however, he vainly sought to secure the imperial throne; and having relinquished to him the crown of Spain on 16th Jan., 1556, he retired to the monastery of Yuste, in Estremadura, where he spent two years partly in mechanical amusements, partly in religious exercises, which are said to have assumed a character of the most gloomy asceticism, and died on 21st Sept., 1558. By his wife Isabella, daughter of king Emmanuel of Portugal, he had one son, his successor, Philip II. of Spain, and two daughters. His brother Ferdinand succeeded him in the empire.

**CHARLES VI.**, German emperor, 1711–40, the last of the proper male line of the house of Hapsburg, was the second son of the emperor Leopold I., and b. 1685. His father intended for him the crown of Spain; but Charles II. of Spain, yielding to French intrigues, assigned it by testament to Philip of Anjou, whereupon arose the great war of the Spanish succession—Britain and Holland taking part with the emperor against France, for the maintenance of the balance of power in Europe. C. was acknowledged by the allies as Charles III. of Spain, but had not succeeded in obtaining permanent possession of the kingdom, when the death of his brother, the emperor Joseph I., recalled him to Germany in 1711; and as he now became emperor of Germany, Britain and Holland concluded the peace of Utrecht with France in 1713. C. continued the war for some time longer; but was at last obliged to give up his claim to Spain, being confirmed, however, in possession of the Spanish Netherlands and of the Spanish possessions in Italy. Success attended his arms in a war against the Turks, and in a war with Spain, which arose out of the project, of the Spanish minister Alberoni, and in which the *quadruple alliance* was formed—France, Britain, and Holland joining the emperor against Spain. But C., having lost his only son, and being very anxious to secure the throne to his own descendants, named his daughter, Maria Theresa (q.v.), as his heiress, by a *pragmatic sanction* (q.v.), to which he had much difficulty in obtaining the consent of some of the German states and some foreign powers; and to accomplish this object he gave up Tuscany, Parma, and Piacenza, and afterwards Naples, Sicily, Lorraine, and some parts of Milan. Meanwhile, he was unsuccessful in wars

with France and Spain, and with the Turks, who compelled him, in 1789, to resign his former conquests. He died 20th Oct., 1740. He was of a mild and benevolent disposition, but full of superstition and of prejudices in favor of feudalism and ecclesiastical domination.

**CHARLES VII.**, German emperor (1742-45), was b. at Brussels in 1697, and was the son of Maximilian Emmanuel, elector of Bavaria, and for some time governor of the Spanish Netherlands. After the conquest of the Bavarian territories, and the pronouncement of the ban of the empire against his father by the emperor Joseph I., he was for some time the emperor's prisoner; but after the decease of Joseph, he married his youngest daughter; and having, in 1786, succeeded his father as elector of Bavaria, refused his consent to the pragmatic sanction (see preceding article); and on the death of Charles VI. in 1740, advanced a claim to the Austrian dominions in right of his wife, and upon the further ground of a testament of Ferdinand I. Success at first attended his arms; he was acknowledged as archduke of Austria, and then as king of Bohemia, upon which he was also, in 1742, elected emperor. But the tide of fortune now turned against him. The Hungarians rose in favor of Maria Theresa, and he was driven from Austria and from Bohemia, and for a time even from his Bavarian capital, Munich. Disease and calamities combined to cause his death, 20th Jan., 1745, shortly before which he said, "Misfortune will never leave me till I leave it."

**CHARLES**, Count of Anjou and Provence, King of Naples and Sicily, about 1220-85. He was the ninth son of Louis VIII. of France, and wedded Beatrice, heiress of Provence, after scattering his rivals by the aid of an army furnished by his brother, Louis IX. His next adventure was on a crusade to the Holy Land in company with his brother, when both were taken prisoners. Returning to Provence, Charles resumed his authority, and began to cherish high ambitions. He first assisted Margaret of Flanders, in a plan to set aside the children of her husband by a former wife, for the aggrandizement of her own offspring, for which Charles was to receive the province of Hainault; but Louis interfered and Charles was compelled to relinquish Hainault for a sum of money. About this time the pope, Urban IV., requested Charles to assume the crown of the Two Sicilies, to assist in the overthrow of the bastard Manfred, the Ghibelline king; and in 1265, Charles was crowned at Rome; a crusade was preached against Manfred, who was taken and killed; Conradin, the legitimate heir, was also betrayed, captured, and murdered; a like fate was dealt out to many Italian nobles: estates were confiscated to reward the French mercenaries; and they established over Sicily an arbitrary and brutal rule. Charles aimed at becoming the head of the eastern empire. With this intent he accompanied his brother on another crusade; but the venture failed in consequence of a great storm and the breaking out of the plague. Charles also incurred the enmity of the pope, Nicholas II., by refusing to accept the hand of his niece for Charles's grandson; so Nicholas went over to the Ghibellines, and took from Charles his titles. But Nicholas died in 1280, and Charles procured the election of a Frenchman, Martin IV., to the chair of St. Peter, in return for which Charles was made senator of Rome, and his rival, the emperor Michael Palæologus, was excommunicated. Another expedition was ready for the east, when news was brought of the rebellion, afterwards known as the Sicilian Vespers (q.v.); the people of Sicily had risen against their conquerors, and on Easter Monday, 1282, nearly exterminated the French in all Sicily. Charles at once sent his fleet against Messina, refusing all offers of capitulation; but the city held out until assistance came from Don Pedro of Aragon, and Charles's fleet was burned. Despairing of other means of success, Charles challenged Don Pedro to single combat; the latter accepted, but only Charles appeared in the list. Soon afterwards Charles's son was defeated and taken prisoner; and in 1285, Charles himself fell ill and died at Poggia.

**CHARLES III.**, of DURAZZO, 1345-87; King of Naples and Hungary. His father, who had rebelled against the queen, Joanna I. of Naples, died in prison; and the queen adopted the son, but afterwards displaced him in favor of Louis of Anjou, the father of Charles V. of France. Charles made an alliance with the king of Hungary, and set out to invade Naples. At Rome he was crowned king by the pope; thence he went to Naples, captured the queen, and had her assassinated. Three years later he was invited to accept the crown of Hungary by the nobles, who were dissatisfied with the rule of Queen Elizabeth, and was crowned on the last day of the year 1386. Five weeks afterwards Elizabeth caused him to be murdered in her own presence. As he and his kingdom of Naples were under papal interdict, his body remained unburied for five years.

**CHARLES I.**, b. 1839; King of Roumania, second son of Prince Charles Anthony of Hohenzollern. In 1866, Charles was elected Regent of Roumania by an almost unanimous vote. He found the country in a wretched condition, the treasury empty, education unprovided for, and the people divided into warring political factions. By energy and good statesmanship he greatly improved matters, and when the Russo-Turkish war began he seized the occasion to proclaim Roumania's entire independence of Turkey, and such a declaration was officially made by the chambers. In 1869 Charles married Princess Elizabeth of Wied (CARMEN SYLVA). In 1881 he was proclaimed king.

**CHARLES II.**, 1661-1700; King of Spain; son of Philip IV. He was but four years old when his father died, the regency being in the hands of the queen, Anna Maria of Austria. During her rule, Spain was much weakened by an unsuccessful war with France and by the loss of Sicily. In 1675, Charles assumed the government, taking for his chief adviser Don John, an illegitimate son of the late king. By marrying Louise of Orleans, a niece of Louis XIV., Charles maintained harmony with France for several years. After her death, Charles married a sister of the emperor, Leopold I., and in 1694 he joined Leopold in a war against France. The war was speedily concluded by the peace of Ryswick, 1697, and as Charles was childless there was a long negotiation concerning the succession, ended through the influence of the pope, who secured the crown for the grandson of Louis XIV., Philip Bourbon, who ruled Spain as Philip V.

**CHARLES III.**, 1716-88; King of Spain, second son of Philip V., and great-grandson of Louis XIV. of France. Parma, Piacenza, and Tuscany having fallen to Spain, Charles, at the age of 15, was furnished with an army and given rule over those countries. At 18 he conquered the Two Sicilies, and the emperor was obliged to acknowledge him as king. On the death of his brother, Charles succeeded to the Spanish throne, in 1759. He was a man of ability and liberal ideas, and made many reforms, especially in financial administration. The Jesuits were banished, and an unsuccessful effort was made to bring the inquisition under the control of the civil power. He endeavored to put a stop to brigandage and to Algerine piracy; and interested himself in the development of commerce, and arts and sciences. In 1763, he ceded Florida to England in exchange for Cuba, and some years later he joined France in sending assistance to the American colonies, then engaged in the war for independence. At the close of the war, Florida was again given to Spain. He made an unsuccessful attempt to rescue Gibraltar from the English. Charles died in Madrid after a reign of 29 years.

**CHARLES IV.**, 1748-1819; King of Spain, son and successor of Charles III. When very young, Charles married his cousin, Maria Louise of Parma, who soon acquired great influence over him. The government was conducted chiefly by Manuel Godoy, a handsome guardsman who gained the friendship of both the queen and her husband, and was made duke of Alcudia, and minister of foreign affairs. Godoy concluded peace with the French republic in 1795, after an unsuccessful attempt on the part of the king to assist his relative, Louis XVI. Soon after this peace an offensive and defensive alliance was made with France, and Spain speedily became involved in war with Portugal and also with England, the main event of which was the destruction of the Spanish fleet by Nelson at Trafalgar in 1805. In 1807, Charles made with Napoleon a secret treaty according to which Portugal was to be seized by the French and Spanish, and the greater part to be divided between Godoy and the queen of Etruria, and Charles was to assume the title of emperor of America; at the same time, 16,000 Spanish troops were to be sent to the assistance of the French in Denmark. While this was going on, Napoleon was intriguing with Don Ferdinand, the heir to the throne, who was soon after discovered in a plot to assassinate his father. Though pardoned, Ferdinand continued to do all that he could to arouse ill feeling against the court, and in 1808, Charles was so alarmed at disturbances in Madrid, that he abdicated in Ferdinand's favor. Charles declared immediately that this act was not voluntary; but the matter was decided by a meeting with Napoleon at Bayonne, urged by Godoy, who was moved by fear of Ferdinand, and also by the queen. Charles surrendered the crown to Napoleon (who gave him a pension of six millions of francs, and the castle and grounds of Chambord), refusing again to assume authority, although he might have done so, his son being very unpopular.

**CHARLES IX.**, 1550-1611; King of Sweden, the fourth son of Gustavus Vasa. The Swedish crown belonged to Charles's nephew, Sigismund, king of Poland; but as he was a Roman Catholic, Charles was appointed to direct the government till Sigismund signed a decree establishing the Lutheran religion in Sweden. After many attempts at accommodation, Sigismund was formally deposed in 1604, and Charles was elected king. He had wars with Poland, Russia, and Denmark, and when 60 years old he challenged the king of Denmark to single combat, but the Dane did not respond. Charles founded the university of Gothenburg, and made a new code of laws. He wrote a rhymed chronicle of the war with Poland.

**CHARLES X.**, or **CHARLES-GUSTAVUS**, king of Sweden, was b. at Nyköping, 8th Nov., 1622. After studying at the university of Upsala, he traveled through France, Germany, and Switzerland, joined the army of Torstensohn (q.v.) in 1642, fought at the battles of Yankovitz and Leipzig; and at the close of the war was the representative of Queen Christina at the conferences which were held for giving effect to the treaty of Westphalia. On the abdication of Christina, Charles-Gustavus, who was the son of Gustavus Adolphus' eldest sister Catharine and John Casimir, the palatine of Zweybrück in Clerburg, succeeded as next heir, 17th June, 1654, to the throne of a kingdom which, after his accession, he discovered to be in an almost bankrupt condition. There was a debt of 10,000,000, while the revenue did not amount to 800,000 crowns, out of which one fourth was granted as a pension to the ex-queen, whose carelessness and extravagance had brought about this deplorable state of matters, and who, in the words of the aged chancellor Oxenstierna, "had cost Sweden dearer than ever an enemy did."

She had taken away everything belonging to the royal residences which was portable; and C. was forced at first to borrow even a set of kitchen utensils. C. was the second of the three great warrior-monarchs of Sweden, but unlike his uncle, who could plead religious grounds, and his grandson, who was at first forced to fight for self-preservation, C. seemed to make war principally for war's sake. First, he attacked Poland in July, 1655, because the Polish monarchs had not resigned their claim to the Swedish throne; captured in the same year Warsaw, Cracow, Thorn, Elbing, Posen, and Kalisz; and drove the king to take shelter in Silesia; he then assailed the Danes, who had declared war against him, crossed the belts on the ice, and speedily made himself master of all the continental possessions of Denmark. Next marching from isle to isle over the frozen sea, he ultimately, by menacing Copenhagen, compelled the treaty of Roskild (7th Mar., 1658), which gave to Sweden, Holland, Scania, Bleckingen, Bornholm, and the other Danish possessions beyond the sound, and emancipated Sweden from the sound dues. Charles, however, still cherished enmity against the Danes; and after fruitlessly proposing to the Dutch and English, a partition of Denmark, he invaded Zealand, and attacked Copenhagen in 1659. The capital, however, defended itself valiantly, aided by succor from the Prussians and Dutch; and the Swedish monarch was compelled to abandon the siege. Soon after, while laboring to effect a complete reconciliation with Poland in order to be free to attack the Danes in Norway, he died suddenly at Gothenburg, Feb. 23, 1660.

**CHARLES XI.**, one of the ablest kings of Sweden, was the son of king Charles (X.) Gustavus, and was b. Nov. 24, 1655. While he was little more than four years old at his father's death, the government was committed to his mother Hedwig as regent, and a council. The peace of Oliva (May 3, 1660) with Poland, by which Sweden obtained Esthonia, part of Livonia, and Oesel, and the Polish monarch renounced all pretensions to the Swedish crown; and that of Copenhagen (June 6, 1660), generally confirmatory of the treaty of Roskild with Denmark, were the first important acts of the government. A treaty with Russia on the basis of the *status quo* followed in 1661; and from this period till 1672, the kingdom was free from foreign wars. In Dec., 1672, C. (whose education had been so ill attended to that he had reached manhood before he could read) took the reins of government, and by the allurements of France, was induced to make war on Brandenburg. This unprovoked attack was disastrous to the Swedes, for they suffered a severe defeat from the elector at Fehrbellin (1675); and though C. revenged himself by defeating the Danes (who were allied with Prussia) at Halmstadt, Lemd, and Landskrona, his fleet was defeated by the Dutch near Oeland, and again by the Danes at Bleking and Klöge; and many of Sweden's recent acquisitions were wrested from her. These, however, were restored by the peace of Saint-Germain-en-Laye (17th Sept., 1679), which closed this needless and unfortunate contest. In 1680, a struggle commenced between the crown, supported by the burghers and peasants, on one hand, and the nobles on the other; and a considerable diminution of the power of the nobles was the consequence. The resumption of all the crown lands which had been alienated since 1609, was a fatal blow to the preponderating power of the nobles; and by a voluntary declaration of the states, Dec. 9, 1682, the king was invested with absolute authority. This voluntary erection of a despotism by the people, a thing of rare occurrence in the world's history, is yet more extraordinary at the close of the 17th c.; and it speaks highly for C. that he never employed his unlimited authority otherwise than for the best interests of his kingdom. By a judicious administration of the revenues, he was enabled to extinguish the public debt (1686), reorganize the fleet and army, and by 1693 to dispense with the calling up of extraordinary subsidies. Though absolute, he never imposed a tax but with consent of the states; and he every year published a detailed account of revenue and expenditure. In 1693, he was formally declared absolute by an act of the diet. The foreign policy of the country was also conducted in a manner equally satisfactory and effective. Deux-Ponts fell to him as heir to his cousin Friedrich-Ludwig, the last palatine, in 1681; the attempts of the Danes upon Holstein were rigorously repressed, and many small outlying territories were brought under his sway. His anxiety for his subjects' welfare was particularly shown by commercial and maritime regulations superior to any that then existed in Europe; and by his numerous journeys to all parts of his dominions to examine for himself into the remote details of the administration. A codification of the laws was commenced but was unfinished at his death, which took place at Stockholm, 15th April, 1697.

**CHARLES XII.**, King of Sweden (1697-1718), was the son of Charles XI., and was b. at Stockholm on the 27th June, 1682. On the death of his father in 1697, he ascended the throne, and notwithstanding his youth, the states declared him of age to assume the reins of government. The neighboring powers thought this a favorable time to humble Sweden, then the great power of the n.; and Frederick IV. of Denmark, Augustus II. of Poland, and the czar Peter I. concluded a league for this object. The Danes began by invading the territory of the duke of Holstein Gottorp, who had married C.'s eldest sister, and who applied to him for assistance. The young king immediately resolved on the most active measures, and approached Copenhagen with such a force as presently compelled the Danes to make peace. C. now hastened to meet the Russians; and although they lay in an intrenched camp beneath the walls of Narva, 50,000 strong, he

stormed their camp on 30th Nov., 1700, with 8,000 Swedes, and defeated them with great slaughter. He next dethroned Augustus II., and procured the election of Stanislaus Leszczyński as king of Poland. Augustus supposed himself safe at least in Saxony, his hereditary dominion, but was followed thither, and humbling terms of peace were dictated at Altranstädt in 1706. C. obtained from the emperor liberty of conscience for the Protestants of Silesia. Leaving Saxony with an army of 43,000 men in Sept., 1707, he proposed to advance direct upon Moscow; but at Smolensk he was induced, by the representations of the Cossack *hetman*, Mazeppa, to change his plan and proceed to the Ukraine, in hope of being joined by the Cossacks. In this hope, however, he was disappointed, and after enduring many hardships, he was defeated by the Russians at Pul-towa, on the 8th of July, 1709, and fled to Bender in the Turkish dominions.

Augustus II. now revoked the treaty of Altranstädt, and the czar and the king of Denmark assailed the Swedish territories. But the regency in Stockholm adopted measures of effective and successful resistance, and C. prevailed with the porte to declare war against Russia, in which Peter seemed at first likely to have suffered a severe defeat. But Russian agents succeeded in inspiring the Turks with suspicions concerning the ultimate designs of C., who was conveyed to Adrianople, but after some time escaped, and made his way through Hungary and Germany, pressing on by day and night with extraordinary speed till he reached Stralsund, where he was received with great joy, on 11th (22d) Nov., 1714. He was soon, however, deprived of Stralsund by the allied Danes, Saxons, Prussians, and Russians. After he had adopted measures for the security of the Swedish coasts, his passion for war led him to attack Norway. Success appeared again to attend his arms, when, in the siege of Friedrichshald, on 30th Nov., 1718, he was killed by a musket-bullet. On his death, Sweden—exhausted by his wars—ceased to be numbered among the great powers. He was a man capable of comprehensive designs, and of great energy in prosecuting them. His abilities appeared not merely in military affairs, but in his schemes for the promotion of trade and manufactures. His self-willed obstinacy, however, amounted almost to insanity; in fact, he has been termed “a brilliant madman.” His habits were exceedingly simple: in eating and drinking, he was abstemious; and in the camp, he sought no luxuries beyond the fare of the common soldier.

**CHARLES XIII.**, King of Sweden (1809–1818), b. Oct. 7, 1748, was the second son of king Adolphus Frederick, and of the sister of Frederick the Great of Prussia. He was trained for naval command, and was long the high admiral of Sweden, in which capacity he distinguished himself by a great victory over the Russians in the gulf of Finland in 1788, and by bringing back his fleet safe to Carlscrona in the most perilous season of the year. He was on several very important occasions called to an active part in political affairs—in the revolution of 1772, when he was made governor-general of Stockholm and duke of Södermanland; after the assassination of his brother Gustavus III. in 1792, when he was placed at the head of the regency; and after the revolution of 1809, when he became administrator of the kingdom, and subsequently king. The Swedish monarchy now became limited instead of despotic. Having no child, C. concurred with the states of the kingdom in choosing as his successor the French general, Bernadotte, who became crown-prince of Sweden, and ascended the throne on the death of C., Feb. 5, 1818. The prudence of the king and crown-prince secured the union of Norway with Sweden in 1814, as a compensation for Finland.

**CHARLES XIV.**, King of Sweden and Norway (1818–1844) originally JEAN BAPTISTE JULES BERNADOTTE, was b. at Pau, in the s. of France, Jan. 26, 1764. He was the son of a lawyer. He entered the French army as a common soldier; became an ardent partisan of the revolution; greatly distinguished himself in the wars of Napoleon, and soon attained the highest military rank. But he was distrusted by Bonaparte, whose ambitious schemes he took no part in promoting; and Napoleon having taken offense at his conduct after the battle of Wagram, Bernadotte left the army in disgust, and returned to Paris. He was afterwards sent by the ministerial council to oppose the British, who had landed at Walcheren, but the breach between the emperor and him grew wider. In 1810, he was elected crown-prince, and heir to the throne of Sweden. Almost the only condition imposed on him was that of joining the Protestant church. He changed his name to Charles John; and the health of the Swedish king, Charles XIII., failing in the following year, the reins of government came almost entirely into his hands. He refused to comply with the demands of Napoleon, which were opposed to the interests of Sweden, particularly as to trade with Britain, and was soon involved in war with him. He commanded the army of the allies in the n. of Germany, and defeated Oudinot at Grossbeeren, and Ney at Dennewitz. He showed great reluctance, however, to join in the invasion of France, and was tardy in his progress southward.—He became king of Sweden on the death of Charles XIII., Feb. 5, 1818. He won for himself the character of a wise and good king. Education, agriculture, manufactures, commerce, and great public works, as well as the military strength of the kingdom, were promoted by his care. He died Mar. 8, 1844, and was succeeded by his son Oscar.

**CHARLES XV.**, 1826–72; King of Sweden and Norway, succeeding his father, Oscar I., who was a son of Charles XIV. The rule of C. was liberal and popular. The most important event was the change (in 1866) in the constitution of the parliament.

which from that time has consisted not of four, but of two chambers, one elected by the provincial representatives and the other by the people. Charles's kindly nature was shown in his firm refusal to sanction capital punishment. He had a taste for literature and art, and published a volume of poems. In 1850, he married Louisa, daughter of the king of the Netherlands, by whom he had one daughter, who became the wife of prince Frederick of Denmark.

**CHARLES**, Archduke of Austria, third son of the emperor Leopold II., was b. at Florence, 5th Sept., 1771. Whilst yet a youth, he pursued military studies with much ardor; and after having greatly distinguished himself as a gen. in inferior commands, he was intrusted, in 1796, with the chief command of the Austrian army on the Rhine. He fought with great success against Moreau at Rastadt, defeated Jourdan in several battles, drove the French over the Rhine, and concluded his victories by taking Kehl in the winter. In 1799, he was again at the head of the army on the Rhine, was several times victorious over Jourdan, protected Swabia, and successfully opposed Massena. In 1800, bad health compelled him to retire from active service; but being appointed gov. gen. of Bohemia, he formed a new army there. After the battle of Hohenlinden, he was again called to the chief command, and succeeded in staying the rapid progress of Moreau, but almost immediately entered into an armistice with him, which was followed by the peace of Luneville. In 1805, he commanded the army opposed to Massena in Italy, and fought the hard battle of Caldiero; but upon bad tidings from Germany, retreated from the left bank of the Adige to Croatia. This retreat was one of his greatest military achievements. In 1809, he won the great battle of Aspern, which first showed to Europe that Napoleon was not invincible; but he did not promptly enough follow up his victory, and Napoleon, who hastened to reinforce his army, retrieved his fortunes at Wagram, and the archduke was now compelled to give way before the enemy, till he reached Znaim, where an armistice was concluded on 12th July. In the campaigns of 1813 and 1814 he had no part; and lived in retirement till his death, 30th April, 1847. He was author of *Principles of Strategy* (1814).

**CHARLES**, ELIZABETH RUNDLE, b. Jan. 2, 1828; the wife of Andrew P. Charles, of London. She wrote *Chronicles of the Schönberg-Cotta Family*; *Diary of Mrs. Kitty Trevylyan*, and other popular works of fiction. She d. in 1896.

**CHARLES**, JACQUES ALEXANDRE CÉSAR, 1746-1823; a French physicist, noted for skill in experiments and public demonstrations. He made the first balloon to hold hydrogen gas, with which a successful ascent was made. He was the inventor of a number of optical instruments.

**CHARLES ALBERT**, King of Sardinia (1831-49), b. 2d Oct., 1798, was the son of the prince Charles Emmanuel of Savoy-Carignan, and in 1800, succeeded to his father's title and estates in France and Piedmont. In 1817, he married Maria Theresa, daughter of the archduke Ferdinand of Tuscany. When the revolutionary movement took place in Piedmont in 1831, he was made reg't, upon the abdication of Victor Emmanuel, until Charles Felix, the brother of the late king, should arrive to assume the sovereignty. He displeased both the liberal party and their opponents, and Charles Felix disallowed all his acts, and for some time forbade his appearance at court. In 1829, he was appointed viceroy of Sardinia. On the death of Charles Felix, 27th April, 1831, he ascended the throne. The liberals had great expectations from him, but were for a long time disappointed; his government much resembled the other Jesuitic and despotic Italian governments, except that he sought to promote the interests of the country, and to restrict the influence of the clergy in political affairs. It was not till after the elevation of Pius IX. to the papedom, when a new impulse was given to the cause of reform, that the Sardinian government adopted the constitutional and liberal policy to which it has since adhered. C. A. entered warmly into the project of Italian unity, and evidently expected to place himself at the head of the whole movement and of the new kingdom of Italy. When the Lombards and Venetians rose against the Austrian government, he declared war against Austria, 23d Mar., 1848, and at first was exceedingly successful, but was insufficiently supported by the Lombards, and finally defeated by the Austrians; so that after the fatal battle of Novara, 23d Mar., 1849, he was obliged, for the preservation of the integrity of his kingdom, to resign the crown in favor of his son, Victor Emmanuel. He afterwards retired to Portugal, and died at Oporto on 28th July of the same year.

**CHARLES AUGUSTUS**, 1757-1828, Grand Duke of Saxe-Weimar. He assumed the government in his eighteenth year, and the next year entered the Prussian army, in which he remained until the defeat at Jena in 1806, when he became a member of the Rhenish confederacy and furnished aid to the French. In 1813, he joined in the coalition against Napoleon, and took command of an army of Saxons, Hessians, and Russians. He fought among the allies in 1815, and the congress of Vienna rewarded his services by enlarging his principality and making it a grand duchy. Charles was an intimate friend of Goethe, Wieland, and other men of letters.

**CHARLES THE BOLD**, Duke of Burgundy (1467-77), son of Philip the Good, of the house of Valois, and of Isabella of Portugal, was b. at Dijon on 10th Nov., 1433, and bore, during his father's life, the title of count of Charolais. He was of a fiery, ambitious, and violent

disposition. From an early period to the end of his life he was a declared enemy of Louis XI. of France, the nominal feudal superior of Burgundy. Louis having caused Philip to deliver up some towns on the Somme, C. left his father's court and formed an alliance with the duke of Bretagne and some of the great nobles of France for the maintenance of feudal rights against the crown. Their forces ravaged Picardy and Isle-de-France, they threatened Paris, and defeated the king at Montherly. The result was a treaty by which the count of Charolais obtained the towns on the Somme and the counties of Bologne, Guines, and Ponthieu for himself. In 1467, he succeeded his father as duke of Burgundy. Richer and more powerful than any prince of that time, he conceived the design of restoring the old kingdom of Burgundy, and for this purpose of conquering Lorraine, Provence, Dauphiny, and Switzerland. Whilst he was making preparations for war, Louis invited him to a conference; he hesitated, and Louis by his agents stirred up the citizens of Liege to revolt. Meanwhile C. consented to the conference, and the news coming of what had taken place at Liege, he seized the king, and if he had not been withheld by his councilor Comines, would have put him to death. He compelled Louis, however, to accompany him to Liege, and apparently to sanction the cruelties which he inflicted on the citizens. War raged between them afterwards with but little intermission till 1475. In Sept. of that year, C. found himself at leisure to attempt the prosecution of his favorite scheme of conquest, and soon made himself master of Lorraine. In the following year he invaded Switzerland, stormed Grandson, and hanged and drowned the garrison; but was soon after terribly defeated by the Swiss near that place, and lost his baggage and much treasure. Three months after, he appeared again in Switzerland with a new army of 60,000 men, and laid siege to Morat, where he sustained, on June 22, 1476, another and more terrible defeat. After this he sank into despondency, and let his nails and beard grow. But the news that the young duke René of Lorraine was attempting to recover his territories, roused him, and he laid siege to Nancy. His army was small; Italian auxiliaries, whom he had hired, went over to the enemy; and in the battle which he too rashly fought, he lost his life, Jan. 5, 1477. His daughter and heiress, Maria, married the emperor Maximilian I. With his life ended the long successful resistance of the great French vassals to the central power of the monarchy.

**CHARLES CITY**, a co. in s.e. Virginia, on the James and Chickahominy rivers; 200 sq.m.; pop. '90, 5066, incl. colored. Productions, corn, wheat, oats, etc. Co. seat, Charles City.

**CHARLES EMMA'NUEL I.**, duke of Savoy (1580-1630), called the Great, was b. at the castle of Rivoli, 12th Jan., 1582, and succeeded his father Emmanuel Philibert in 1590. He married a daughter of Philip II. of Spain, and at first allied himself politically with Spain, and made war against France for the marquise of Saluzzo (or Saluces), which he obtained in 1601, upon the cession of some other territories to France. But he afterwards joined France and Venice to oppose the preponderant power of Spain in Italy; then allied himself with the house of Hapsburg, and set up a claim to Montferrat, but suffered, in consequence, the direst calamities, great part of his dominions being conquered by the French, and in their hands when he died, 26th July, 1630. He was a prince of vast ambition, and for whom no enterprise was too bold.

**CHARLES**, surnamed **MARTEL**—i.e., the hammer—was the son of Pepin of Heristal, mayor of the palace under the last Merovingian kings, and was b. about 690 A.D. After his father's death in 714, he was proclaimed mayor of the palace by the Austrasian party. King Chilperic and he now quarreled, and a civil war arose which ended in C. becoming undisputed mayor of the palace and ruler of the Franks. During the latter years of his life, he indeed allowed the nominal throne to remain occupied—the titular kings being mere puppets in his hands. He was much engaged in wars against the revolted Alemanni and Bavarians, the Saxons, etc., but his importance as a historic personage is chiefly due to his wars against the Saracens, who, having conquered Septimania from the western Goths in 720, advanced thence into Aquitaine, conquered Bordeaux, defeated the duke of Aquitaine, crossed the Garonne, advanced to the Loire, and threatened Tours. C. defeated them between Tours and Poitiers in 732 in a great battle, in which their leader, Abd-ur-Rahmān, fell, and a stop was put to their progress in Europe, which had filled all Christendom with alarm. He defeated them again in 788, when they had advanced in the Burgundian territories as far as Lyon; deprived them of Languedoc, which he added to the kingdom of the Franks; and left them nothing of their possessions n. of the Pyrenees beyond the river Aude. He died on the 22d Oct., 741, at Quiercy on the Oise, in the midst of his victories, his projects, and his greatness, leaving the government of the kingdom to be divided between his two sons—Carloman, and Pepin the Short.

**CHARLES MIX**, a co. in s.e. S. Dakota, on the Missouri river; formed 1862; organized in 1879. Co. seat, Wheeler. Area, 1130 sq.m.; pop. '90, 4178.

**CHARLES RIVER**, a stream rising in Central Massachusetts, and flowing easterly to Boston harbor. It affords valuable water-power in many places, and in its lower course its banks are lined with large and small manufacturing villages.

**CHARLES'S WAIN**, a common name for the constellation of Ursa Major (q.v.).

**CHARLESTON**, a co. in s.e. South Carolina on the ocean, and including several islands; 193 sq.m.; pop. '90, 59,903, includes colored. The Santee river is the n. e. border, and the Ashley, Edisto, and Cooper rivers intersect the co. The surface is low and level, and much of the soil is very rich, producing sea-island and short staple cotton, rice, corn, sweet potatoes, etc. The Atlantic Coast Line, the Plant System, and the South Carolina and Georgia railroads intersect. Co. seat, Charleston.

**CHARLESTON**, city and co. seat of Coles co., Ill., on the Cleveland, Cincinnati, Chicago and St. Louis, and the Toledo, St. Louis, and Kansas City railroads; 48 m. w. of Terre Haute. It has a State normal school, churches, national bank, and newspapers, and manufactures flour, woollens, iron, etc. Pop. '90, 4135.

**CHARLESTON**, city, port of entry, and co. seat of Charleston co., South Carolina; the largest city of the state, and one of the chief seaports of the Southern States; at the confluence of the Ashley and Cooper Rivers, about 6 miles from the ocean; lat. 32° 47' n.; long. 79° 57' w.; 100 miles s.e. of Columbia; 82 miles n.e. of Savannah.

**HISTORY.**—In 1669 an English colony landed at Port Royal, but removed the next year, and founded Charles Town, on the west bank of the Ashley River, 3 miles above the present city. In 1680 the town was transferred to the peninsula between the Ashley and Cooper Rivers. In 1685–6 many Huguenot refugees settled in Charleston, but its growth was slow until the development of the cotton trade. In 1755, 1200 exiles from Acadia settled in Charleston, and in 1793, 500 French refugees from San Domingo. At the time of the Revolution, Charleston was one of the chief cities of America, and was the first Southern city that entered into the revolutionary movements of 1775. June 28, 1776, the garrison on Sullivan's Island, commanded by Colonel Moultrie, repulsed an attack by a British fleet, but the city was captured by Sir Henry Clinton, May 12, 1780, after an obstinate defense. Charleston was incorporated in 1783, and was the capital of the state till 1790. It was the centre of the nullification movement of 1832, and the first open action in favor of secession was taken here, in the Declaration of Secession, December 20, 1860. Fort Sumter was bombarded and taken by the Confederates, April 12–13, 1861. In 1863, a Federal fleet, under Admiral Dupont, attacked the fortifications in the harbor, but without success, and the city remained in possession of the Confederates until the surrender of Columbia to General Sherman, February 17, 1865, when it was evacuated, and all the public buildings, stores, cotton-warehouses, and shipping were fired by order of General Hardee, the Confederate commander. The Union forces took possession February 18. During the war many buildings were destroyed, and the towers and steeples of the churches riddled with shot and shell. Between 1860 and 1865 commerce was utterly ruined, and not until a year after the peace was the city again made a port of entry. Charleston was damaged by a cyclone, August 25, 1886; and on the night of August 31, 1886, one-half the city was destroyed by a severe earthquake, with a loss exceeding \$5,000,000.

**TOPOGRAPHY.**—Charleston is a beautiful old town, with picturesque houses, adorned with vine-covered balconies, and surrounded generally by semi-tropical gardens. It lies on a peninsula three miles long and about one and a half miles wide. At the extremity is the beautiful Battery, situated like that of New York, a broad esplanade, 1500 feet long, with a good view of the harbor and the forts. Facing it is a curving row of beautiful residences, both old and new. West of the Battery is White Point Garden, on Battery Square, shaded by fine live-oaks, and containing the Jasper Monument, commemorating the gallant act of the Revolutionary hero, and the bronze bust of Wm. Gilmore Simms, the Southern novelist. Meeting Street, the principal business street, extends from the Garden to the railroad station. The lower portion is lined with fine private houses, embowered in roses and myrtles. At its intersection with Broad Street is a group of public buildings: the Court House and the new Post Office on the left, and on the right the City Hall, containing some valuable portraits, and St. Michael's Church, built in 1752–61. It resembles St. Martin's-in-the-fields, London, and is the most beautiful Colonial church in America. In the lofty tower is a fine set of chimes, brought from England in 1764. The church was nearly destroyed by the earthquake in 1886. On the upper part of Meeting Street is Marion or Citadel Square, containing a statue of John C. Calhoun, the famous South Carolina statesman. On the north side of the square is the South Carolina Military Academy, usually known as the Citadel. On the next street east, Church Street, is St. Philip's Church, similar in style to St. Michael's. It is the third building, but is a copy of the church destroyed in 1835. The churchyard contains Calhoun's grave. On a side street, near Church Street, stands the interesting old Huguenot church, the only one in America still using a translation of the French liturgy, published at Neufchatel in 1737. On East Bay is the old pre-Revolutionary post office, and the handsome new marble Custom House, which cost \$3,000,000.

**INSTITUTIONS, ETC.**—The most prominent charitable institutions are the Orphan House, founded in 1792, and said to be the oldest institution of the kind in America; the Enston Home for the Aged, consisting of a group of forty cottages and a church; the Home for Widows and Daughters of Confederate Soldiers, the City Hospital, and Roper Hospital. There are 60 churches and 2 synagogues. The most prominent churches besides St. Michael's and St. Philip's are the handsome Circular Church (Congrega-



tional), and St. Finbar's Cathedral, rebuilt in 1890. Charleston has a high school and several public schools; the Avery Normal Institute for colored teachers and Wallingford Academy for colored youth; and the Porter Manual Training Institute. The higher educational institutions are Charleston College, founded in 1785, which contains a fine museum, the South Carolina Medical College, and the South Carolina Military Academy, whose cadets fired the first shot in the Civil War from a battery on Morris Island against the *Star of the West*, Jan. 9, 1861. The libraries are the Charleston, founded in 1748, the 'Apprentices', and the Minors'. The principal clubs are the Charleston Club, the Carolina Yacht Club, the Queen City Club and the St. Cecilia Society, founded about 1762, and probably the oldest social organization in the country, and the most exclusive in Charleston. The principal park is White Point Garden. The Park in front of the City Hall contains a statue of William Pitt, erected in 1770; the right arm was shot off by the British in 1780. At the west end of Broad Street is a popular resort, skirting an inlet of the Ashley River. Marion Square is used as a parade-ground, and in the north-western part of the city is Washington Race-course, opened in 1792. Sullivan's Island has a fine beach, and is a favorite summer resort. Two bridges over the Ashley River give access to the suburbs, which abound in picturesque scenery and in places of interest. One of the chief attractions is the Gardens of Magnolia, containing superb magnolia bushes, sometimes fifteen to twenty feet high, and also fine magnolias and japonicas. Another point of interest is the Church of St. James, Goosecreek, built in 1711, and near it is a superb avenue of oaks, two hundred years old. North of the city, three miles from the City Hall, is the beautiful Magnolia Cemetery, famous for its azaleas, magnolias, camellias, and fine live-oaks, the trunk of one having a girth of eighteen feet.

**HARBOR.**—The harbor, formed by the junction of the Ashley and Cooper Rivers, has an average width of two miles and a depth of forty feet at the city. A bar extending in front of Sullivan's and Morris forms an outer harbor. Since the construction of jetties at these islands, the channel has been deepened to 22-26 feet. A lighthouse west of this channel has a light elevated 133 feet above the sea. On the island opposite the Battery is Castle Pinckney; Fort Ripley is farther out. Fort Moultrie, on Sullivan's Island, and Fort Johnston, on James Island, stand opposite each other, and Fort Sumter is on a small island at the entrance of the harbor, halfway between them. The city has about nine miles of water front, and most of the wharves lie on the Cooper River. The Clyde line of steamships ply between Charleston and New York, and there is steamboat connection also with Boston, Baltimore, Savannah, Georgetown, Beaufort and the Florida ports. Charleston is the terminus of the Plant system of railroads, and of the South Carolina and Georgia, and the Atlantic Coast line roads, and the city has ample street railroad accommodations.

**COMMERCE.**—Before the war Charleston was the chief cotton port in the United States, but it now ranks after New York and New Orleans. The present prosperity of the city is owing to the discovery of valuable beds of phosphates, the best of which are on the Ashley River. In 1895 the number of manufactories in Charleston was 405, with an aggregate capital of \$12,077,000, employing 6,858 persons, and the value of the products was \$16,882,000. The principal products were fertilizers, value \$4,265,000; rice, \$1,000,000; saw and lumber mill products, \$850,000; cotton goods, \$700,000; and flour and grist, \$700,000. The receipts included 420,169 bales of upland cotton; 276,778 tons of crude phosphate rock; 81,908,589 cubic feet of lumber and cross-ties; 74,492 barrels of rosin; 88,428 bales of domestic cotton goods; and 160,000 tons of fertilizers. The wholesale and retail trade aggregated \$29,159,000. In the calendar year 1896, the value of all imports was \$646,584, and of all exports, \$11,149,168. The chief articles of export are cotton, rice, fertilizers, phosphates, lumber, naval stores, and iron and steel. Large quantities of fruits and early vegetables are shipped to northern cities. In 1895 the assessed valuations were, real, \$16,630,364, personal, \$6,112,472—total \$22,742,836, with a tax rate of \$21 per \$1,000; and in 1896 the total bonded debt was \$3,839,700. The city has an elevation of eight or ten feet; the average temperature in summer is 79.55°; in winter, 57.46°. The drainage is tidal, and water is supplied by artesian wells. Pop. '90, 54,955.

**CHARLESTON**, town, capital of W. Va., and co. seat of Kanawha county; at the junction of the Kanawha and Elk rivers, 130 m. s. by w. of Wheeling. The Chesapeake and Ohio, the Ohio Central lines, and the Charleston, Clendennin, and Sutton railroads intersect. C. is an important shipping point; packets to Pittsburg, Cincinnati, and Gallipolis carrying the coal, iron ore and timber found in its neighborhood. The manufactures include iron, flour, sawed lumber, barrels, pumps, woollens, and cigars. The salt springs above the city are exceeded in productiveness by those of Syracuse, N. Y., only. The chief buildings are the state house and custom house. C. has an opera house, hotels, churches, banks, and several newspapers. A fort was built at C. about 1786; the town was incorporated in 1794; as a city, 1870. It has been the capital since 1869, with the exception of the period, 1875-85, when Wheeling was the seat of government. Pop. '90, 6742; since said to have more than doubled.

**CHARLESTOWN**, now a part of Boston, but formerly a city of Middlesex co., Mass. It is situated on the northern bank of the Charles river, and is connected with Boston by two free bridges. The Mystic river, which unites with the Charles at this

point, forms the boundary on the e. and north. The pop. in 1873, when the city was annexed to Boston, was 28,373. From the territory of Charlestown, originally very large, several towns have been taken on its northern side. The surface of the remaining portion is very uneven, two eminences, Bunker and Breed's Hills, rising near the centre, and affording many fine building sites. On Bunker Hill was fought a celebrated battle of the revolution, June 17, 1775, commemorated by a granite shaft erected on the summit and rising to the height of 230 feet. The corner-stone of this monument was laid in 1825 by Gen. Lafayette, and the work was finished in 1843. The attempt of the Massachusetts committee of safety to fortify this eminence was the immediate occasion of the battle, in the course of which the town was burned by the British, being set on fire by shells from Copp's Hill in Boston, and by men who were sent across the Charles for that purpose. C. is well built, having some fine streets and residences. It has an abundant supply of water from Mystic Lake, excellent schools, churches of various denominations, a public library, and a home for aged and indigent women. The state prison was formerly located here and the buildings used for that purpose are still standing. A navy-yard of the United States, covering more than 70 acres of ground, and having all the appointments required for such an establishment, has existed here since 1798. C. is also a place of considerable business. It has manufactories of steam engines, boilers and machinery, of stone and brass-ware, gas fixtures, mechanics' tools, leather, draw-pipes, sugar, soap, etc.

**CHARLESTOWN**, village and co. seat of Jefferson co., W. Va., on a branch of the Baltimore and Ohio railroad, 10 m. s.w. from Harper's Ferry; pop. '90, 2287. It is in a fine agricultural district. It was in this village that John Brown was tried, condemned, and hanged Dec. 2, 1859, and here a confederate force surprised union troops, Oct. 18, 1863, without gaining any advantage.

**CHARLET, NICOLAS TOUSSAINT**, a French painter and engraver, b. in Paris, 1792, was for some years employed as a clerk in a government office, but lost his place at the restoration, 1815, on account of his Bonapartism, and in consequence betook himself to art. After studying awhile under Gros, he gradually formed for himself a style in which he had no rival. C. is the Béranger of caricature, but without the political bitterness and sarcasm sometimes found in the poet. His genial sketches of French life and manners were studied with equal admiration in the salons of the aristocracy and in the ateliers, barracks, taverns, etc., of the lower classes. C. was especially successful in his sketches of soldiers and children. His designs are free from exaggeration, while full of spirit, interest, and naïveté; and his titles or mottoes were often so witty and suggestive, that dramatic writers have founded pieces upon them. His sketches and lithographs are very numerous, and are widely distributed. Among his paintings, the most remarkable are—"An Episode in the Russian Campaign" (in the museum at Versailles); "Moreau's Crossing of the Rhine" (at Lyons); and a "Procession of the Wounded" (at Bordeaux). C. died in 1845.

**CHARLEVILLE**, a t. of France, in the department of Ardennes, about a mile from Mezières, with which it communicates by a suspension bridge over the Meuse. It is a thriving place, well built, with clean spacious streets. It has manufactures of hardware, leather, and beer, and the Meuse affords facilities for considerable trade in coal, iron, slate, wine, and nails. Pop. '91, 17,390.

**CHARLEVOIX**, a co. in n.w. Michigan, on lake Michigan and Green river; 427 sq. m.; pop. '90, 9686. Grand Traverse bay bounds the county on the w., and Little Traverse bay on the north. The chief business is agriculture. Co. seat, Boyne.

**CHARLEVOIX**, a co. in the province of Quebec, Canada, forming a triangle, one side of which runs 80 or 90 m. along the n.w. bank of the St. Lawrence, reaching nearly to the Saguenay river; 5,224 sq. m.; pop. '91, 19,037, of whom all but 15 were Roman Catholics. The surface is mountainous, and not well adapted to agriculture. It is intersected by five or six rivers that fall into the St. Lawrence, and one that joins the Saguenay. Chief town, St. Paul's Bay.

**CHARLEVOIX, PIERRE FRANÇOIS XAVIER DE**, 1682-1761; a French Jesuit who was sent as a teacher to Quebec in 1705. After about five years he returned to France, and became professor of belles-lettres. He returned to Canada in 1720, and journeyed up the St. Lawrence and the lakes and down the Illinois and Mississippi to New Orleans, and thence went to Paris. His principal work is a valuable *History of New France* (or Canada), which was not published in English until 1865. He also wrote a history of Christianity in Japan, and a history of Paraguay.

**CHARLOCK**. See **MUSTARD**.

**CHARLOIS**, a village of the Netherlands, situated on the Maas, about 2 m. s.s.w. of Rotterdam. It is memorable on account of a terrible accident which occurred here in 1512, when a religious procession crossing the ice in defiance of magisterial prohibition, 8,000 of them were precipitated into the Maas. Pop. 2,000.

**CHARLOTTE**, a co. in s. Virginia, on Staunton river; intersected by the Norfolk and Western and the Southern railroads; 600 sq. m.; pop. 15,077, includ. colored. Surface hilly; productions, wheat, corn, oats, and tobacco. Co. seat, Smithville.

**CHARLOTTE**, a co. in s.w. New Brunswick, on the Maine border and the bay of Fundy; 1823 sq. m.; pop. '91, 23,752. The country is traversed by the New Brunswick and Canada, and the North American and European railroads. Shipbuilding and sea-fishing are the occupations of a great portion of the inhabitants. Chief town, St. Andrews at the mouth of St. Croix river.

**CHARLOTTE**, city and co. seat of Eaton co., Mich., 18 m. s.w. of Lansing, on the Michigan Central and the Chicago and Grand Trunk railroads; pop. '90, 3867. Lumber and agricultural products furnish the greater part of its trade. The city has gas, electric lights, water-works, public library, high school, national banks, and several weekly and monthly periodicals.

**CHARLOTTE**, city and co. seat of Mecklenburg co., N. C., on Sugar Creek, and the Southern and the Seaboard Air Line railroads; 45 miles s. w. of Salisbury. The city is in the gold region of the state, and a branch mint was established here in 1888 which was closed by the breaking out of the civil war, and reopened in 1899, and made an assay office. The city has many handsome residences, churches, and hotels, two opera houses, Biddle University (Presb.), public library, public park, a military institute, national banks, several newspapers, manufactures of cotton, iron, machinery, tobacco, cotton seed oil, fertilizers, agricultural implements, etc. The Mecklenburg Declaration of Independence (q. v.) was adopted here in May, 1775. In 1780 the British occupied Charlotte. Pop. '80, 7094; '90, 11,557.

**CHARLOTTE AMALIE**, chief, or rather only, town of St. Thomas, one of the Virgin group of the Antilles, in lat. 18° 20' n., long. 64° 55' west. It contains 11,400 inhabitants, nearly three-fourths of the entire population of the colony. It has a spacious harbor, which is largely visited by European ships in general.

**CHARLOTTE AUGUSTA**, 1796-1817; daughter of George IV. and Queen Caroline of England. She was well educated under the care of the bishop of Exeter and Lady Clifford. It was desired that she should wed the prince of Orange, but she loved and married prince Leopold of Saxe-Coburg, who, long after her death, became king of Belgium. She was married May 2, 1816; was delivered of a still-born child early in Nov. of the next year, and died, in consequence of malpractice, as was believed. Her officiating physician committed suicide. Her domestic life was most wretched, as her published letters show.

**CHARLOTTE HARBOR**, or **BOCA GRANDE**, an inlet in the gulf coast of Florida, 25 m. long, and 8 to 10 m. wide, with an entrance three-fourths of a mile wide, and 30 to 40 ft. deep. There is a good harbor, sheltered from the sea by a number of islands. Wild fowl, fish, and oysters are plentiful.

**CHARLOT TENBURG**, a t. of Prussia, in the province of Brandenburg, is situated on the Spree, 3 m. w. of Berlin, with which it is connected by a road leading through the *Thiergarten*, and affording a favorite promenade to the Berliners. C. contains a royal palace, with a fine garden and splendid orangery, and an interesting collection of antiquities and works of art. In a beautiful part of the park a mausoleum, designed by Schinkel, contains the remains of Frederick William III. and his wife, the queen Luise, with their statues by Rauch, and also of Kaiser Wilhelm I. Pop. '95, 182,883.

**CHARLOTTESVILLE**, a city and co. seat of Albemarle co., Va., 97 m. n.w. of Richmond, on the Southern and the Chesapeake and Ohio railroads. It is in an agricultural and fruit-growing region, has important manufactures, and is the seat of the university of Virginia, founded by Thomas Jefferson; and Monticello, Jefferson's home, is but 3 m. distant. Pop. '90, 5591.

**CHARLOTTETOWN**, capital of Prince Edward Island, in Queens co. and on the s. coast, is situated on Hillsborough bay, at the confluence of three rivers which admit the largest vessels. The town stands on rising ground and contains a provincial building, a government building, court-house, Y. M. C. A. building, an athensum, exchange, a Dominion building (post-office, etc.), city-hall, two hospitals, an asylum for lunatics, a normal school, Prince of Wales college, St. Dunstan's (R. C.) college, a Methodist college, and a business college. A woolen factory, iron foundry, carriage and furniture factories, railroad workshops, breweries, and the exportation of grains (except wheat), pork, potatoes and fish, make it a busy place. There are steamers to various ports of the Dominion, churches, banks, gas and electric lights, excellent waterworks, splendid driving courses, and newspapers. Pop. '81, 11,485; '91, 11,374.

**CHARLTON**, a co. in s.e. Georgia, on the Florida border, including a portion of the great Okefenoke swamp; 1055 sq. m.; pop. '90, 3335, includ. colored. Productions, rice, cotton, tar, and turpentine. Surface level and soil sandy. Co. seat, Trader's Hill.

**CHARM** (Lat. *carmen*, a song), properly a form of words, generally in verse, supposed to possess some occult power of a hurtful, a healing, or a protective kind. Charms exert their influence either by being recited, or by being written and worn on the person; and, in this latter case, they may be classed with amulets (q. v.). The nature of this superstition will be more fully considered under INCANTATION; see also MAGIC.

**CHARMANTE GABRIELLE**, French romance, attributed to Henri IV., who sent the song with music to his mistress, Gabrielle d'Estrées, in a letter dated May 21 [1597], before he went on the campaign against the Spaniards. The words are thought to have been written by Bertaut, bishop of Seez, and the melody is supposed to be older. It is

found in the *Thesaurus harmonicus* of Besard (1602), and in the *Cabinet, ou Trésor des nouvelles Chansons* (1602), and, although Henri IV. has been credited with the music, the true composer is unknown.

**CHARNEL-HOUSE** (Fr. *charnier*; Lat. *caro*, flesh), a chamber situated in a churchyard or other burying-place, in which the bones of the dead which were thrown up by the grave-diggers were reverently deposited. The C. was generally vaulted in the roof, and was often a building complete in itself, having a chapel or chantry attached to it. In such cases, the charnel-vault was commonly a crypt under the chapel; and even in churches, it was not uncommon for the vault or crypt to be employed as a charnel-house.

**CHARNOCK, STEPHEN, D.D.**, 1628-80; an English non-conformist minister, educated at Cambridge. He began to preach in London, and went thence to Dublin, where he was successful. In 1660, he was silenced by the act of uniformity, and returned to London; he continued 15 years in and near that city, preaching, but without a settled congregation. Many of his sermons have been published, and his work on the *Attributes of God* is still highly valued. He was a vigorous and original, as well as judicious thinker; and as a writer he was vivid and clear.

**CHARON**, in classical mythology, the son of Erebus and Nox, is first mentioned by the later writers of Greece. His duty was to ferry the shades of the buried dead across the rivers of the under-world. For this service, he exacted an *obolus* from each, and in consequence, a coin of this kind was placed in the mouth of the dead. If this rite was neglected, C. refused to convey the unhappy shade across, and it was doomed to wander restlessly along the shores of Acheron. C. is generally represented as a gloomy old man, with a rough beard and wretched clothes. In the Etruscan monuments, he holds a hammer.

**CHARON'DAS**, a lawgiver of ancient Greece, by some supposed to have been a disciple of Pythagoras. It is related that he fell a sacrifice to one of his own laws, by which it was made a capital offense to appear armed in a public assembly. On returning from a military expedition he hastened to quell a tumult, having his sword at his side. Being reminded by a citizen of his law, he replied, "Then I will seal it with my blood," and immediately plunged his sword into his breast.

**CHAROST, ARMAND JOSEPH DE BETHUNE, Duc de**, 1810-65; a descendant of Sully, the famous marshal. C. took part in the revolution of 1830 as a republican, and in 1833 was made a lieut. Afterwards he served in Algeria, and after the revolution of 1848 he was appointed under secretary of state. He was one of the zealous republicans in the national assembly, and one of the victims of Dec. 2, 1851, being imprisoned at Ham, and afterwards exiled to Belgium. In 1854, Napoleon III. expelled him from France, and he went to Holland and afterwards to Switzerland. He wrote a history of the campaign of 1815, in which he severely criticised Napoleon's generalship, and a history of the war in Germany in 1818.

**CHARPIE**. Surgeons lint, or the scrapings or ravelings of linen cloth, used in the dressing of wounds, ulcers, etc.

**CHARQUI**. See **JERKED BEEF**.

**CHARR**, *Salmo umbla*, a fish of the same genus with the salmon, occurring in the lakes of Britain and of the continent of Europe. It is abundant in the lakes of Cumberland and Westmoreland, and in some of those of Ireland, of the n. of Scotland, and of Orkney, but in the greater number of the Scottish lakes it is not found. It is the celebrated *ombre chevalier* of the lake of Geneva. It is sometimes found weighing more than 2 lbs., but is generally under 1 lb. in weight. It has only the anterior part of the *comer* (the middle line of the palate) furnished with the teeth, agreeing in this with the salmon and bull-trout, and differing from the common trout, salmon-trout, etc. The form is elongated, the greatest depth of the fish about one fifth of the entire length; the fins are rather small; the tail deeply forked; the color of the back dark olive, the sides lighter and spotted with either red or white, according to the condition in which the fish is at the time, the belly also being sometimes deep orange, and sometimes of a pale color; these, and other accidental variations, causing the fish to receive different names.

On some lakes, vast quantities are caught for the table, particularly for the purpose of potting. A C. is now and then taken with fly when the angler may be whipping a lake, which perhaps abounds with them, for trout; but this occurs but seldom. The C. will, too, occasionally take a minnow, if sunk deep and trailed slowly; but the sport it affords is of the most precarious nature. C. are fast diminishing in those of the English lakes which they still inhabit, owing to the wholesale and indiscriminate slaughter which occurs at the spawning season. A large kind of C., sometimes reaching 4 lbs. in weight, is found in some of the more northern Swedish lakes.

**CHARRIÈRE, OR CHARRIÈRES, ISABELLE AGNÈTE DE SAINT-HYACINTHE DE**, 1740-1805; a native of Holland, daughter of a Dutch baron, and married to a Swiss, who had been her brother's teacher. In 1786, appeared her most important book, *Caliste, or Letters Written in Lausanne*. She traveled in France and England, and was

an intimate friend of Benjamin Constant. She was a brilliant and beautiful woman, but, owing to loss of her estate, the latter years of her life were spent in strict seclusion.

**CHARBON, PIERRE, 1541-1603**; a French philosopher, one of the 25 children of a bookseller of Paris. He studied law at Bruges, and began practice in Paris, but not having immediate success, he went into the church, and rose to eminence as a preacher. At Bordeaux he formed a short but famous and important friendship with Montaigne, who, on his death in 1592, requested C. to bear the arms of the Montaigne family. In 1594, C. published *Le Trois Verités*, in which he seeks to prove that there is a God and a true religion, and that the true religion is the Roman Catholic. This was followed by a book of sermons, and in 1601 came his most remarkable work, *De la Sagesse*, a complete popular system of moral philosophy. This work brought upon its author the most violent attacks, but a second edition was soon called for. This, after much opposition, began to appear in 1603, but only a few sheets had been printed when C. died suddenly in the street.

**CHART**, a marine or hydrographical map, exhibiting a portion of a sea or other water, with the islands, coasts of contiguous land, soundings, currents, etc. See **MAR**. In the English service, when coasts have been surveyed by the admiralty, charts are engraved, and are sold at various prices, from 3s. down to 6d. each. This price is below their cost, the object being to encourage their general use as much as possible. Men-of-war are supplied with copies of every available C. published, relating to the regions likely to be visited. There is a printed list for every station. At Gibraltar and the Cape of Good Hope, there are depots of charts to supply ships whose destination undergoes a change. All the charts are brought home again, and none are reissued until revised and corrected. The navigating charts, showing the dangers of coasts, with sufficient clearness to enable mariners to avoid them, are generally on the scale of half an inch to a mile; those of larger size show all the intricacies of the coast. The merchant service in the United States is supplied with charts engraved and sold at less than their cost, by the coast-survey department of the United States navy. They are usually constructed on the principle of Mercator's projection. See **MAR**.

**CHARTA, MAGNA**. See **MAGNA CHARTA**.

**CHARTÆ LIBERTATUM**, charters of liberties; the *Magna Charta* (q.v.) and the *Charta de Foresta*, the latter made up of forest laws confirmed by Edward I.

**CHARTÉ** (Fr. a charter; Lat. *charta*, paper). In the sense in which we have adopted this word from the French, and in which it may be now said to form part of our language, it signifies a system of constitutional law, embodied in a single document. Whether any system of positive public law existed in ancient France is, in that country, a subject of keen dispute amongst constitutional antiquaries. If any such there was, there seems little doubt that it was the mere embodiment of traditions, and not the result of any single act of the national will. Whilst France was divided into provinces and communes, local liberties and privileges unquestionably existed; but where the nation constituted no single body, a constitutional charter was impossible. The first traces of such a C. appear in the 14th c.; and it is known in the history of the public law of France as the *grand charter*, or the charter of King John. Up to this time, the kings had called together only partial assemblies, but in 1355 deputies from the whole kingdom were assembled in the hall of the parliament of Paris. The nobility and clergy, secular and regular, were represented by 400 deputies, the commons or third estate by a like number. This body assumed to itself the initiative, and prepared a species of constitution, which was accepted by the king. The chief triumph of the third estate on this occasion consisted in carrying through the doctrine, that the decision of any two estates should be invalid without the concurrence of the third. The three orders, who seem to have composed but one assembly, then proceeded to impose a series of restrictions on the power of the monarch, which, confirmed by the dauphin two years later, formed the foundation for the liberties subsequently asserted at the revolution.

But the constitution to which the term C. is most frequently applied by the French and by us, is that in which Louis XVIII. solemnly acknowledged the rights of the nation on his restoration in 1814. This C. has ever since been considered the fundamental law of constitutional monarchy when that form of government has existed in France. In some of its provisions, however, and still more in the mode of its acceptance by the monarch, as "a voluntary and free act of our royal authority," and as a "concession made to," not a contract entered into with, his subjects, it was open to the misconstructions which eventually led to the revolution of 1830. The "charte" sworn to on the 29th Aug. of that year by King Louis Philippe modified this and some of the other provisions of that of 1814. On that occasion, the king explicitly recognized the sovereignty of the people. This document, which, with some modifications, remained in force till the revolution of 1848, is of so much importance, not only from its bearing on the past history, and possibly on the future destiny of France, but from the analogies which it presents to our own constitution, that we shall endeavor to present a condensed view of its leading provisions.

It consisted of 67 articles, divided into 7 heads. Of these, the 1st head, containing 11 articles, treated of the public rights of the French people. It provided for the equality of all Frenchmen—a doctrine inherited from the revolution, and which it unfortunately left to be understood in a sense inconsistent with monarchy, and indeed with any other form of government than pure democracy (see *LIBERTY; EQUALITY, ETC.*)—for their equal admissibility to all employments, civil and military, and for their freedom from arrest, otherwise than by legal process. It guaranteed the enjoyment of religious liberty, and the payment of the ministers of all Christian denominations—a privilege which in 1831 was extended even to Jews. The liberty of printing and publishing was insured, the censorship of the press and conscription were abolished, an amnesty for all political offenses was proclaimed, and the security of property guaranteed, except when its sacrifice should be requisite for the public good, in which case it was declared that the owner must be indemnified. The 2d head set forth the nature and limitations of the kingly power in 8 articles. The supreme executive power, the command of the army and navy, and the right of making war, and treaties of peace, alliance, and commerce, were reserved to the monarch. To him, also, it belonged to nominate to all offices of public administration, to make all necessary regulations for the execution of the laws, but in no case to suspend them or dispense with them. The high duties of legislation were shared between the king, the chamber of peers, and the chamber of deputies; it being provided that every law should be agreed to by a majority of each chamber, and sanctioned by the king. Any one of the three branches of the legislature might originate any bill, except a money-bill, which was reserved for the chamber of deputies, as for the house of commons in England. The 3d head contained ten articles regarding the chamber of peers, the nomination of whom was vested in the king (the princes of the blood being peers by right of birth). No limit was set to their number; but by the law of 9th Dec., 1831, incorporated in the C., it was declared that their dignity should be for life only. The chancellor of France was president. The chamber of peers assembled simultaneously with that of the deputies, and its sittings were public. The personal privileges of the peerage, as they exist in England, were introduced. The 4th head concerning the chamber of deputies contains 16 articles. It provides for the election of the deputies and the sittings of the chamber. The electoral qualification is declared to be the payment of 200 francs of direct taxes, whilst that of a deputy is the payment of 500. The voting is by ballot, both at elections and in the chambers. The number of deputies, which at first was 430, was afterwards raised to 459. Each deputy was elected for 5 years, and one half of those for each department were required to have their political domicile within it. The C. became a nullity by the revolution of Feb., 1848; and by the new constitution promulgated on the 4th of Nov. of that year, the monarchy of France was converted into a democracy. By chapter 4 of that document, the legislative power was vested in a single assembly of 950 members, including the representatives of Algeria and the other colonies. The property electoral qualification was abolished, and the age reduced for electors to 21, and for delegates to 25. The period of three years was fixed for the continuance of the national assembly. By chapter 5, the executive power was intrusted to a citizen, who was to bear the title of president. He was not to be less than 30 years of age, his tenure of office was to be 4 years, and he was not to be re-eligible until after an interval of 4 years. For an account of the subsequent changes by which these and the other arrangements adopted at the revolution of 1848 have since been superseded, see *FRANCE*.

**CHARTER** (Lat. *charta*; Gr. *chartes*, paper, or anything written upon, from *charasso*, to scratch or write). In its most general signification, C. is nearly synonymous with *deed* and *instrument*, and is applied to almost any formal writing, in evidence of a grant, contract, or other transaction between man and man. In private law, its most important use is in the alienation of real estates, the writing given to the new proprietor by the old, in proof of the transference title, being usually called a charter. In public law, the name is given to those formal deeds by which sovereigns guarantee the rights and privileges of their subjects, or by which a sovereign state guarantees those of a colony or other dependency. See *CHARTER, MAGNA CHARTA*. There is another sense of the term, in which it is in a measure intermediate between the two we have mentioned—viz., where we speak of the C. of a bank or other company or association. In this latter sense it signifies an instrument by which powers and privileges are conferred by the state on a select body of persons for a special object. See *BANK, CORPORATION, JOINT-STOCK COMPANY, ETC.* The requisites of a C., when used in the first of these significations, according to the law of England, will be pointed out under *DEED*.

**ROYAL CHARTERS**, generally written in Latin, are of two kinds: I. Grants of lands, houses, honors, or liberties to persons who did not previously possess them; II. Charters confirming grants previously made, and therefore called "charters of confirmation." Confirmation charters are of three kinds: 1. Charters confirming previous grants, without reciting them; 2. Charters of simple confirmation, without addition of anything new; 3. Charters reciting previous charters and confirming them, with addition of something new. These last two classes of charters are called charters of "*inseximus*," or "*vidimus*," from the word used by the granter in saying that he has seen the C. which he confirms. Royal charters generally contain seven clauses: 1. The "premises,"

i.e., the name and style of the granter, the persons to whom the C. is addressed, the name and style of the grantee, the reason why the grant is made, and the description of the thing granted; 2. The "tenendum and habendum," i.e., the way in which the thing granted was to be held and had; 3. The "reddendo," the return of rent or service which was to be made to the granter by the grantee; 4. The "quare volumus," or order that the grantee should have the thing granted, under certain penalties; 5. The "sealing" or "signature" clause, setting forth the seal, signature, or subscription by which the C. was authenticated; 6. The "hiiis testibus," or testing-clause, enumerating the persons who were present as witnesses when the C. was granted; 7. The "date," setting forth the time when, and the place where, the C. was granted.

CHARTER, in American colonial history, means the grant of franchise, governmental privileges, and estates to companies for the purpose of establishing colonies, to the inhabitants of colonies in general, or to individual proprietors. Of the first sort, were the charter of Massachusetts Bay granted by Charles I. (1629), and the charter of Georgia granted by George II. (1732). Of the second sort was the charter of Connecticut granted to the people of the colony by Charles II. (1660). Of the third sort were the original charter of New York, granted to the duke of York by Charles II. (1664), and the charter of Maryland, granted to Lord Baltimore by Charles I. (1632).

Charters are either *blench* or *feu*, from the nature of the service stipulated—*a me* or *de me*, from the kind of holding or relation between the granter and grantee; and original or by progress, from being first, or renewed, grants of the subjects in question.

*Blench and Feu Charters.*—The duty which the superior required of his vassal in former times was almost always military service, and the vassal was then technically said "to hold ward"—to hold on condition of warding or defending his superior. But subsequent to the rebellion of 1745, in which the dangerous tendencies of the feudal relation were experienced, this holding was abolished (20 Geo. III. c. 50), and the only duties which it has since been lawful to insert in C. are *blench* and *feu* duties. The former is a merely nominal payment—a penny Scots, a red rose, or the like, *si petatur tantum* (should it be asked); the latter is a consideration of some real value. Original *blench* C. having lost all object, and having no other effect but that of subjecting superiors to considerable expense in keeping up their titles, have become rare in modern practice. The forms of charters varying according to the circumstances in which they are granted, and the relations established between the granter and grantee, are of too technical a nature to admit of explanation in this work. They will be found very clearly and shortly stated in Bell's *Law Dictionary*, voce "Charter."

**CHARTER-HOUSE** (a corruption of *Chartreuse*, i.e., Carthusian), the name of a hospital, chapel, and school-house in London. The C. was instituted in 1611 by sir Thomas Sutton, Camps castle, in the co. of Cambridge. In 1872 the school was transferred to Godalming, Surrey. It had originally been a Carthusian monastery (founded in 1371), but on the dissolution of monastic establishments by Henry VIII., it was made a place of deposit for his nets and pavilions. After undergoing many alterations, and passing into the possession of various distinguished persons, it was finally purchased from lord Suffolk, for £13,000, by sir Thomas Sutton, who endowed it with the revenues of upwards of 20 manors, lordships, and other estates, in various parts of England. This "masterpiece of Protestant English charity," as old Fuller calls it, serves three uses—it is an asylum for poor brethren, an educational and a religious institution; hence Bacon terms it a "triple good." The *poor brethren* are 80 in number. None are admitted under 50 years of age, and only those who have been housekeepers are eligible. Each brother has a separate apartment, a share of attendance from domestics, an ample, though plain diet, and an allowance of about £26 a year for clothes and other matters, and four weeks' holiday every autumn. The brethren must be bachelors and members of the church of England. Among the poor brethren in by-gone years were Elkanah Settle, the antagonist of Dryden; John Bagford, the antiquary; Isaac de Groot, a descendant of Grotius; and Alexander Macbean, who assisted Johnson in the preparation of his dictionary. The *scholars* are 60 in number, admissible between the ages of 11 and 15. They are understood to be "the sons of poor gentlemen to whom the charge of education is too onerous;" as in the case of the *poor brethren*, it is not always the proper parties who are chosen. There are exhibitions, scholarships, and medals competed for at certain times by the scholars. In addition to the scholars properly so called, i.e., such as receive a free board and education, a large number of youths are sent to the charter-house school because of its reputation. These either board with the masters, or simply attend during the day. The number of extra boarders is nearly double that of the scholars. The institution is under the direction of the queen, 15 governors, selected from great officers of the state, and the master himself, whose salary from the foundation is £800 per annum. Among the eminent individuals educated in this establishment, are Dr. Barrow, Judge Blackstone, Addison, Steele, John Wesley, Bishop Thirlwall, George Grote, W. M. Thackeray, and sir Charles Eastlake.

The buildings were close together in C.-house square. When the C. school removed to Godalming, the school premises were sold to the merchant Taylor's school, which is now installed here in handsome new school buildings, erected 1875. The quaint old hospital and chapel, the latter containing Sutton's tomb, still remain.

**CHARTER OAK**, a large and famous tree that stood in Hartford, Conn., until blown down, Aug., 1856, when its age was computed to be nearly 1000 years. Sir Edmund Andros assumed his unwarranted government of the Connecticut colony, at Hartford, on the night of Oct. 31, 1687, and, according to a generally accepted tradition, the colonial charter was brought into the council-chamber. By previous agreement, the lights were suddenly blown out, and Captain Joseph Wadsworth, seizing the document so necessary to the liberties of the people, escaped and hid it in a hollow of the tree, where it remained till 1689.

**CHARTER-PARTY** (Fr. *chartre-partie*, so called from such documents being at one time divided—in Fr. *parti*—and one half given to each party concerned), the title given to a contract in which the owner, or master of a ship, with consent of the owner, lets the vessel, or a portion of her, to a second party, for the conveyance of goods from one port to another port; hence the vessel is said to be *chartered*. The document must be stamped. It must specify the voyage to be performed, and the terms on which the cargo is to be carried. On the part of the ship, it is covenanted that she shall be seaworthy; well-found in rigging, furniture, and provisions; and that the crew be suitable in number and competency; that she shall be ready to receive the cargo on a given day, wait its complete delivery for a certain period; and sail for the stipulated port when laden, if the weather for the time permits. The freighter's portion of the contract obliges him to load and unload at suitable periods, under specified penalties, and to pay the freight as agreed on. The master must not take on board any contraband goods, or otherwise render the vessel liable to seizure. The owner is not responsible for losses caused by war, fire, or shipwreck, unless arising from negligence of the master or crew.

**CHARTIER**, ALAIN, the most distinguished man of letters in France in the 15th c., supposed to have been born about 1392. After studying at the university of Paris, he is supposed to have entered the service of Charles VI., and after that to have followed the fortunes of Charles the Dauphin, afterwards Charles VII. Of stories connected with him, the one of the kiss bestowed by Margaret of Scotland, wife of that Louis the Dauphin who was afterwards to be known as Louis XI., "on that precious mouth from which has issued so many witticisms and virtuous sentences," is interesting if only as a proof of the high degree of estimation in which the ugliest man of his day was held. His best works are said to be *Le Livre des Quatre Dames*, which was called forth by the battle of Agincourt, and *Le Quadrilogue Invectif*, a patriotic dialogue. He d. about 1430.

**CHARTISM**, a movement in Great Britain for the extension of political power to the great body of the people, arising in a great measure out of wide-spread national distress and popular disappointment at the results of the reform bill. Prior to 1831, the middle classes had sought popular aid towards obtaining their own enfranchisement. The assistance was given, the people expecting to receive help in their turn. After the passing of the reform bill, agitation ceased for a time, and the members returned to parliament were indifferent, or opposed, to any further change in the political arrangements of the country. The middle classes were satisfied with their own success, and generally looked with small favor on projects for the further extension of political influence among the masses. A season of commercial depression set in about 1835, and falling harvests for several years terribly increased the sufferings of the people. Food became dear, wages fell, manufactories were closed, work became scarce. The people associated their sufferings with their want of direct influence upon the government, and agitation for an extended franchise began. In 1838, a committee of 6 members of parliament and 6 working-men prepared a bill, embodying their views as to what were just demands on the part of the people. This was the "people's charter." It claimed—1. The extension of the right of voting to every (male) native of the United Kingdom, and every naturalized foreigner resident in the kingdom for more than two years, who should be 21 years of age, of sound mind, and unconvicted of crime; 2. Equal electoral districts; 3. Vote by ballot; 4. Annual parliaments; 5. No property qualification for members; and 6. Payment of members of parliament for their services. This programme was received with enthusiasm. Immense meetings were held all over the country, many of them being attended by two or three hundred thousand people. Fiery orators fanned the popular excitement, and under the guidance of the extreme party among their leaders, physical force was soon spoken of as the only means of obtaining justice. The more moderate and thoughtful of the chartists were overruled by the fanatical and turbulent spirits, and the people, already aroused by suffering, were easily wrought into frenzy by those who assumed the direction of their movements. In the autumn of 1838, torch-light meetings began to be held. The danger of these meetings was obvious, and they were at once proclaimed illegal. Some of the more prominent leaders were arrested, amid intense popular excitement, and subjected to various terms of imprisonment. A body calling itself the national convention, elected by the chartists throughout the kingdom, commenced sitting in Birmingham in May, 1839. It proposed to the people various means of coercing the legislature into submission, recommending, among other things, a run on the savings-banks for gold, abstinence from excisable articles, exclusive dealing, and in the last resort, universal cessation from labor. During its sittings, a collision took place with the military in Birmingham. Public meetings were forbidden, and alarming excesses were committed by the irritated mob. In June, 1839, a petition in favor of the charter was presented to the House of Commons, signed by 1,280,000 per-



sons. The House refused to name a day for its consideration and the national convention retaliated by advising the people to cease from work throughout the country. Fortunately, this advice was not followed, but the disturbance in the public mind increased, and in Nov., an outbreak at Newport took place, which resulted in the death of 10 persons and the wounding of great numbers. For taking part in this wild insurrection, three of its leaders were sentenced to death, but their punishment was afterwards commuted to transportation. In 1842, great riots took place in the northern and midland districts, not directly caused by the chartists, but encouraged and aided by them after the disturbances began. In the same year, an attempt was made by Joseph Sturge to unite all friends of popular enfranchisement in a complete suffrage union, but he only succeeded in dividing their ranks. In 1848, the turmoil in France created great excitement in England, and much anxiety was felt lest an armed attempt should be made to subvert the institutions of the country. Two hundred thousand special constables were enrolled in London alone. There were several local outbreaks, and much real danger, but the attempts at disorder were efficiently met, and, as usual, the only result was the punishment of the more prominent men, and the postponement of the desired reforms.

Since 1848, C. has gradually died out. Its principles were not new. The duke of Richmond, in 1780, introduced a bill into the House of Lords to give universal suffrage and annual parliaments. In the same year, Charles James Fox declared himself in favor of the identical six points which were afterwards included in the charter. And nearer our own time, earl Grey, Mr. Erskine, sir James Mackintosh, and many others, formed a "society of friends of the people," which aimed at obtaining a very large extension of the suffrage.

The great body of chartists were, however, not so much actuated by the weight of precedent or argument, as impelled by the pressure of actual want, and an indefinite feeling that the laws were somehow to blame for not providing them with the means of comfortable subsistence. But there were many among them who had studied the principles involved in their demands, and maintained them from an intelligent conviction of their truth. These men declared that all persons had an equal natural right to share in determining the laws under which they lived; and further, that as they were required to contribute to the taxation of the country, they were justly entitled to be heard as to the application of the public funds. Taxation and obedience being universal, representation ought to be so. This view being conceded, all the other points of the charter naturally followed, they being merely arrangements for securing the free action of the right contended for. Some of the chartist advocates went far beyond this. There were those among them whose aims included little less than the reorganization of society. One of the ablest advocates of the cause wrote in favor of nationalizing the land, and remodeling the currency; he also proposed a system of state loans for the assistance of laborers who desired to become capitalists, and national marts for the exchange of wealth on terms of equity and justice. Pressed a little further, these views would have developed into communism; but so far as we are aware, most chartists held so strongly the doctrine of *individual* rights, that they were not likely to subordinate *man* to *society*. See COMMUNISM, SOCIALISM. The object aimed at by the majority was merely the extension of the franchise to the masses, in the belief that they would use it wisely and honestly, and put an end to what they considered the selfish and interested rule of classes who had long monopolized the control of the state. The opponents of C. answered, that if the question was argued as one of right, it would go far beyond the conclusions which the chartists had reached. The *right* appertained to women as well as to men, and there was no just reason why sane persons under 21 should be deprived of it. It would also, they maintained, give all power to the most ignorant classes of the community, and thus subject intelligence to brute force. Government existed for the benefit of society, and ought, as far as possible, to depend on the wisdom, and not on the mere number of the people. Then if representation depended upon taxation, it should vary in proportion to the taxes paid. Finally, they denied that men *as such* had a right to vote; their right was to be well governed, and universal suffrage was more likely to destroy society than to confer happiness or insure justice.

The cause which put an end to C. as an organization was undoubtedly the improvement in the circumstances of the people which followed the repeal of the corn laws. Since then, the chief points of the charter have actually become law. A property qualification is no longer necessary in a representative; the reform acts of 1867-68 have virtually established manhood suffrage; and the act of 1872 gave vote by ballot. The efforts of the majority of those who live by manual labor are now directed towards securing, by trades-unions and other means, a larger share than formerly in the profits of industry.

**CHARTRES**, a city of France, in the department of Eure-et-Loir, 47 m. s.w. of Paris, is built partly at the base and partly on the declivity of a hill overlooking the river Eure, which is here divided into two channels, one flowing within, and the other without the ramparts, which are converted into agreeable promenades. C. consists of an upper and lower town, connected by streets almost inaccessible to carriages. The upper town has some good streets, but the lower is ill built. The houses are old, and many of them composed of wood, with their gables to the street. The cathedral, one of the largest and most imposing ecclesiastical structures in Europe, with its lofty spires, one of them towering to a height of more than 400 ft., crowns the top of the hill. It has numerous painted-glass windows, the workmanship of which is unsurpassed, if indeed equaled,

elsewhere in France, and many of them date from the thirteenth century. It is also famous for its sculptured scenes from the life of Christ and of the Virgin. The church of St. Pierre, and the obelisk to the memory of gen. Marceau, are also objects of interest. It is a great market for the cattle and grain of the surrounding region. It has manufactures of woolen, hosiery, and leather. Pop. '91, 23,108.

**CHARTRES, ROBERT PHILIPPE LOUIS EUGÈNE FERDINAND D'ORLÉANS**, Duc de, b. 1840; the youngest son of the late duke of Orleans, and grandson of Louis Philippe. His father died when he was but two years old, and when he was eight the revolution drove him into exile. He was cared for at Eisenach, in Germany, but soon afterwards joined his family, who were in England. In 1860, he traveled in the east, and in 1861 came to the United States with his elder brother, the count of Paris. Both of them served for a time in the war between the states on Gen. McClellan's staff; but went to England in the summer of 1862. In June, 1863, Robert married his cousin Françoise Marie Amélie d'Orléans, by whom he has five children. After the revolution of Sept., 1870, he returned *incognito* to France, and served in Gen. Chanzy's army; and in 1871, after the repeal of the act banishing the Orléans family, he was appointed a maj. in the army and served in Algeria. He was suspended from the active list in 1883, and expelled from the army by the law of 1886.

**CHARTREUSE, LA GRANDE**, a celebrated monastery in France, in the department of Isère, situated 13 m. n.e. of Grenoble, in the wild and romantic valley of the Guiers, nearly 4,000 ft. above the sea. It is surrounded by the mountain-forests of the Alps; and the route to it, through a mountain-gorge, down which a rapid river dashes far below the traveler, while above him rise precipitous and foliage-lined rocks, some hundreds of feet in height, is one of the most picturesque. The convent is a huge ungainly structure, dating mostly from the 17th c., earlier buildings having been destroyed several times by fire. The convent owes its origin to St. Bruno, who settled a little higher up the mountain in 1084, giving the name of the place, C., to his order. The monks had at one time considerable property, but they were despoiled at the revolution of 1789.

**CHARTREUSE**, a famous kind of liqueur (q.v.), so called from the fact that it is made at the celebrated Carthusian monastery near Grenoble. Three qualities are made, green, yellow, and white, the green being the richest and most delicate in flavor. Chartreuse is said to be a most complex product, resulting from the maceration and distillation of balm leaves and tops as a principal ingredient, with orange peel, dried hyssop tops, peppermint, wormwood, angelica seed and root, cinnamon, mace, cloves, Tonquin beans, *Calamus aromaticus*, and cardamoms.

**CHARTULARY** (Lat. *chartularia*, *chartologia*) is, as its name implies, a collection of charters. So soon as any body, ecclesiastical or secular, came to be possessed of a considerable number of charters, obvious considerations of convenience and safety would suggest the advantage of having them classified and copied into a book or roll. Such book or roll has generally received the name of a chartulary. Mabillon traces chartularies in France as far back as the 10th c., and some antiquaries think that chartularies were compiled even still earlier. But it was not until the 12th and 13th centuries that chartularies became common. They were kept not only by all kinds of religious and civil corporations, but even by private families. Many of them have been printed.

**CHARYBDEE**. See SCYLLA AND CHARYBDEE.

**CHASE**. When one vessel is pursuing another at sea, the pursued vessel is often called the *chase*, and the pursuer the *chaser*. The manœuvre also gives name to certain guns on board ship: a *bow-chaser* being a gun pointing ahead, and a *stern-chaser* pointing astern.

**CHASE**, a co. in e. central Kansas, on the Neosho river and its affluents, intersected by the Atchison, Topeka and Santa Fe railroad; 750 sq.m.; pop. '90, 8238. It is an agricultural region. Co. seat, Cottonwood Falls.

**CHASE**, a co. in s.w. Nebraska, formed 1878; surface level, with little timber; area, 868 sq.m.; pop. '90, 4807. Co. seat, Imperial.

**CHASE, IRAH, D.D.**, 1793-1864; educated at Middlebury college and Andover theological seminary, and ordained in 1817. He labored for a time as a Baptist missionary in West Virginia, and in 1818 became professor in a theological school in Philadelphia. The school was transferred to Washington, and he remained in his professorship seven years. In 1825, he aided in establishing a theological school at Newton Center, Mass., in which he was a professor for nearly 30 years. In 1830, he assisted in founding the Baptist mission in France. Among his works are *The Life of John Bunyan*; *The Design of Baptism*; *The Work Claiming to be the Constitution of the Holy Apostles, revised from the Greek*; *Infant Baptism an Invention of Man*; and many sermons and essays.

**CHASE, PHILANDER, D.D.**, 1775-1853; graduated at Dartmouth in 1795, and ordained to the ministry of the Episcopal church in 1798. He labored as a missionary in western New York, and in 1811 became rector of Christ Church in Hartford, Conn. In 1817 he went to Ohio, where, two years afterward, he was chosen bishop. A few years later he laid the foundation of Kenyon college and Gambier theological seminary. In 1835, he became bishop of Illinois, where he was instrumental in founding Jubilee college, at Robin's Nest, where he died. Among his works are, *A Plea for the West*; *The Star in the West*, or *Kenyon College*; *Reminiscences*, etc.

**CHASE, SALMON PORTLAND, 1808-73**; b. N. H. He was the son of a farmer, and a nephew of Bishop Chase, who supervised his earlier education. Graduating from Dartmouth college in 1826, he opened a school for boys at the national capital, and in 1830 was admitted to the bar, where almost his earliest work was the preparation of an edition of the statutes of Ohio with annotations, and a sketch of the history of the state. This assisted him in gaining practice, and in 1834 he was appointed solicitor in Cincinnati for the bank of the United States. His first effort in a cause touching slavery was in defense of a colored woman claimed as a fugitive. He maintained that the fugitive slave law of 1793 was void, because unwarranted by the federal constitution. In the same year he defended James G. Birney (subsequently the candidate of the abolitionists for president), who had been prosecuted under the state law for harboring a slave. In this case he argued that slavery was a local institution, and that as the slave had been brought into a free state by his master, he was in fact free. In 1846, in the Van Zandt case before the U. S. supreme court, he took the ground that under the ordinance of 1787 no fugitive from service could be reclaimed from Ohio unless he had escaped from one of the original states; that it was the understanding of the makers of the constitution that slavery was to be left to the disposal of the several states, without sanction or support from the federal government; and that the clause in the constitution relating to persons held to service was a compact between the states, conferring no power of legislation on congress, and was never intended to confer such power. In 1841, he was prominent in the organization of the liberty party of Ohio, which nominated him for governor. In the national liberty convention at Buffalo in 1843, and in subsequent conventions until the nomination (in 1848) of Martin Van Buren for president, C. was a leading member, and in most cases directed the proceedings. In Feb., 1849, he was chosen U. S. senator from Ohio, his vote coming from all the democrats and a few freesoil members. He acted generally with the democrats until the nomination (in 1852) of Pierce on a strongly pro-slavery platform, when he withdrew and undertook the formation of an independent democratic party. The debate on the Nebraska bill gave him an opportunity to oppose the famous compromise, to which he moved an amendment looking to the exclusion of slavery from all the territories; but it was not adopted. Through all the contest for the repeal of the Missouri compromise and the Kansas debate, he was foremost in opposition to slavery extension. In the mean time, he was heard on other important subjects. He favored internal improvements by the general government, and supported the free homestead movement, and cheap postage. In 1855, he was elected governor of Ohio by the votes of the opponents of the Nebraska bill, and he was re-elected in 1857. His name was before the first national convention of the republican party (1856) for president, but was withdrawn at his own request. He was named, also, in the convention that nominated Lincoln, but was not pressed. In 1861, he was appointed secretary of the treasury, and held the office until July 30, 1864, when he resigned. In this position the arduous duties of sustaining the national credit in the struggle with the civil war devolved in a great degree upon him; and he proved equal to the occasion. The death of Roger B. Taney in Oct., 1864, made a vacancy in the chair of the chief justice of the U. S. supreme court, which was immediately filled by the appointment of C., in which capacity he presided at the trial on the impeachment of Andrew Johnson in Mar., 1868. About this time, his dissatisfaction with the course of the republican party became so decided as to throw his influence on the side of the democrats, at whose national convention, July, 1868, he was prominently, though unsuccessfully, urged as a presidential candidate. In 1870, he was stricken with paralysis, the effects of which lasted until his death.

**CHASE, SAMUEL, 1741-1811**; one of the signers of the declaration of American independence; son of an Episcopal clergyman, and a lawyer in Annapolis, Md. He was one of the earliest and strongest friends of colonial liberty; was a member of the continental congress for four years, and in 1776 went with Charles Carroll and others on the fruitless errand to induce the Canadians to join in the rebellion against English rule. He filled several judicial offices in Maryland, and in 1796 was appointed associate justice of the U. S. supreme court. In 1804, John Randolph brought about his impeachment for misdemeanor in the conduct of political trials, but he was found not guilty on trial by the U. S. senate. He remained on the supreme court bench until his death.

**CHASE, WILLIAM MERRITT**, American artist, was born in Franklin, Ind., in 1849; began his studies in 1868 under B. F. Hays, a portrait painter in Indianapolis; in 1869 removed to New York and studied at the National Academy of Design; spent the years 1872-78 abroad, at Munich chiefly as pupil of Wagner and Piloty, returning to make New York his residence. He was president of the Society of American Artists in 1894-95; sold his collection of paintings and bric-a-brac in 1896; and took a class of young men and women artists to Spain for several months' study in 1897. Among his works, which are remarkable for vigor of execution and for rendering of textures, are *The Dowager* (1875); *The Court Jester*, which received a medal at the Centennial Exhibition; *Ready for a Ride* (1878); *Portrait of General Webb* (1880); *The Coquette* (1884); *Summer Afternoon in Holland* (1887); *Au Revoir* (1889).

**CHASIDIM** ("Pietists"). This name anciently denoted a whole class of Jewish sects. After the Babylonish captivity, the Jews, with regard to their observance of the law of

Moses, were divided into two classes—*Chasidim* and *Zadikim*. When the so-called great synagogue was commissioned by the Persian government to draw up a code of civil and religious laws for the emigrant Jews returning to settle in their native land, several innovations were made on the Mosaic law. Those who accepted these innovations were styled the C.; while those who rejected them were styled, or styled themselves, the *Zadikim*, or "upright," because they adhered strictly to the law given by Moses, without observing any of the additions made to it. The C. branched forth into several sects, all holding traditions in connection with the written law, which they believed to possess a divine sanction equally with that law. The Pharisees, so often mentioned in the New Testament, formed an early sect among the C., while from the *Zadikim* sprang forth the Hellenistic Samaritans, Essenes, Sadducees, etc. Afterwards, the C., or Pharisees, split into Talmudists, Rabbinites, and Cabalists, some of whom underwent still further subdivision.—The modern C. are not, like those in the times of the Maccabees, marked by any peculiar spiritualistic tendency in religion, but rather by a strict observance of certain traditional forms, and a blind subservience to their teachers. Their doctrine was promulgated in the middle of the 18th c. by Israel of Podolia, called *Baal-Shem* ("lord of the name," so called because he professed to perform miracles by using the great cabalistic name of the supreme being). Though condemned by the orthodox rabbis, this new teacher had great success in Galicia, and when he died (1760) left 40,000 converts. They are now broken into several petty sects; their religion is utterly formal, and its ceremonies are coarse and noisy.

**CHASING**, the art of working raised or half-raised figures in gold, silver, bronze, or other metal. It was called *calatura* by the Romans; and the term is expressly limited by Quintilian to working in metal. The same art when exercised on wood, ivory, marble, precious stones, or glass, was called *sculptura*. See **CARVING**. Iron was sometimes, though rarely used, silver having been always the favorite metal for this purpose. Closely connected with, but still distinguished from C., is the art of stamping with the punch, which the Romans designated by *excudera*. The Greek *torontike* is usually supposed to correspond to C., but the point is by no means free from dispute. The art was known at a very early period, as may be inferred from the shield of Achilles, the ark of Cypselus, and other productions of the kind. Such portions of the colossal statues made by Phidias and Polycletus, as were not of ivory, were produced by the toreutic art. The statue of Minerva was richly adorned in this manner. Besides Phidias and Polycletus, Myron, Mys, and Mentor were celebrated toreutic artists in antiquity, and amongst many moderns the most famous is Benvenuto Cellini (q.v.).

**CHARLES, MICHEL**, b. 1793; a French mathematician, educated at the Paris Polytechnic School. In 1841 he was appointed professor of geometry in that institution. Among numerous essays and books of his productions are: *Historical Views of the Origin and Development of Methods in Geometry*; *History of Arithmetic*; and *Treatise on Superior Geometry*. In 1851, he became a member of the academy, and in 1867, he reported to that body that he was in possession of 27,000 letters and documents of great antiquity and value, among them letters and papers believed to have been written by Dante, Petrarch, Rabelais, Julius Cæsar, Shakespeare, and other persons of renown. Only about 100 of these were genuine, though they completely imposed upon C. and other good judges. The forger, Irene Lucas, was imprisoned two years for forgery and fraud. C. d. 1890.

**CHARLES, VICTOR EUPHÉMION PHILARÈTE**, 1798-1873; a French writer who traveled in the United States about 1820-23. In 1837, he was director of the Mazarin library, and in 1841, professor of German language and literature in the college of France. He published in 20 vols. *Comparative Studies of Literature*; wrote tales and books of travel; and prepared editions of classic authors.

**CHASSE**, music composed in imitation of the chase, and performed chiefly by horns, occasionally combined with other wind instruments. Its movement is in  $\frac{3}{4}$  time. The best specimens of this kind of music are an overture by Mehul, and a C. for the piano-forte by Kreutzer.

**CHASSE-CAFÉ**. See **POUSSE-CAFÉ**.

**CHASSÉ, DAVID HENDRIK**, Baron, was b. in Tiel, Mar. 18, 1765, began his military career when but ten years of age, became a lieutenant in 1781, and capt. in 1787. After the revolution of that year, C., as siding with the humbled Dutch patriots, took French service; was appointed lieutenant-col. in 1798; and, two years later, found himself marching towards the Netherlands under the command of Pichegru. He afterwards fought with the French in Germany and Spain, gaining great distinction and the appellation of *Général Bayonnette*. As lieutenant-gen. of the Dutch forces in 1815, C. added to his laurels on the field of Waterloo. After the peace he was made governor of Antwerp in 1830, and bravely defended it against the united Belgians and French from Nov. 29 till Dec. 23, 1832, when he was forced to surrender. He died in May, 1849.

**CHASSELLOUP-LAUBAT, JUSTIN NAPOLEON SAMUEL PROSPER DE**, Marquis, 1805-73; in 1837, a member of the French chamber of deputies and afterwards councillor of state. In 1849, he was again a member, and then and afterwards a supporter of Louis Napoleon, who made him minister of marine. He was for some years the president of the colonial board of Algeria. In 1869, he presided over the council of state until the accession of Ollivier's administration.

**CHASSEPOT**, a breech-loading rifle invented by Antoine Alphonse Chassepot, b. Mar. 4, 1838. He was attached, in 1858, to the Government workshops of St. Thomas at Paris, of which he was made director in 1864; and was afterwards officially attached to the national manufactory of arms at Chatellerault, near Poitiers. He took out patents for his invention, and the royalty has brought him a large income. He was decorated with the cross of the legion of honor in 1866. The first model of the C. was exhibited in 1868; but it was not introduced in the French army till after the Prussians had proved the efficiency of the needle-gun in the war of 1866 against Austria; it was used successfully in the Franco-German war of 1870. The C. is an improved needle-gun; the fulminate is in a paper wad which forms the rear of the cartridge envelope; the gas check is a cylindrical ring of vulcanized India rubber, which is pressed against the surface of the chamber when the explosion takes place; the cartridge envelope is of silk or linen, with a caliber of .433 inch. The gun has 4 grooves, and can be fired 12 times a minute at a range of 1200 yards. An improved form of the C. has been recently introduced in France, in which the metallic cartridge can be used. See *illus.*, *GUN*, vol. VII., fig. 14, and the article **BREECH-LOADING ARMS**.

**CHASSEURS** (Fr., hunters) is a name used for two important forces in the French army. The mounted C. (*chasseurs-à-cheval*) are a body of light cavalry, designed for service in advance or on the flanks of the army, and correspond most nearly to the light horse of the British service. The name is first used in this sense in 1741, and has been retained while the force it denotes has undergone many alterations in organization and equipment. In 1831, a body of cavalry was raised for service in Africa, mounted on Arab horses, and with a distinct uniform. These have since become famous as the *C. d'Afrique*. After the reorganization of the French army in 1878, the effective army contained 14 regiments (subsequently increased to 20) of *chasseur-à-cheval*, besides 4 regiments of *C. d'Afrique*.—The infantry C. (*chasseurs-à-pied*) are a light infantry force in many respects corresponding with the cavalry C., and like them intended for detached service (like the rifle corps in the English army). The French are believed to have adopted the idea of such a force of sharpshooters from the *Jäger* (the German word corresponding to C. or *hunters*) in the German armies. First used in the thirty years' war, the *Jäger* derived their name from the fact that they were chiefly drafted from amongst mountaineers and inhabitants of forest regions. They have always been regarded as a valuable contingent in the Prussian and Austrian armies, or even constitute the entire force of light infantry. In France, the equipment of the C. differed little from that of the other infantry; it was not until the formation, in 1838, of the *C. de Vincennes*, that the experiment of a specially armed force of sharpshooters was fairly tried. The fame of the C. de Vincennes for rapidity and precision of movement, as well as for the accuracy of their fire, soon vindicated the importance of this branch of the infantry; and at present there are 80 battalions of *chasseurs-à-pied* in the French army.

**CHASTELARD**, PIERRE BOSCOBEL DE, 1540-63; a French poet, a scion of the house of Bayard. The name of Chastelard is romantically connected with that of Mary queen of Scots. He was a page in the house of Marshal Danville, whom he accompanied in his journey to Scotland as escort of Mary in 1561. C. returned to Paris in the marshal's train, but left almost immediately for Scotland bearing letters of recommendation to Mary from Montmorency, and also the "regrets" addressed to the queen by Pierre Ronsard. C.'s master in the art of song. The enthusiastic page fell in love with the queen, who is said to have encouraged his passion. Copies of verses passed between them, and she lost no occasion of showing herself partial to his person and conversation. The young man hid under her bed, where he was found by the maids of honor; but Mary pardoned the offense, and the old familiarity between them was resumed. Again C. was so rash as to violate her privacy; but he was discovered, seized, sentenced, and hanged the next morning. He met his fate consistently, reading, on his way to the scaffold, Ronsard's "Hymn to Death," and turning at the moment of doom towards Holyrood, addressing to his unseen mistress the famous farewell: "Adieu! thou so fair and so cruel; thou killest me, and yet I cannot cease to love thee!" Another story is that he simply ejaculated "Cruel queen!" emphasizing the words by a threatening gesture. See Swinburne, *Chastelard, A Tragedy* (1866).

**CHASTELER**, JEAN GABRIEL JOSEPH ALBERT, Marquis de, 1763-1825. He was in the Austrian service as a general officer, and served in the war of the Bavarian succession, and in the war against the Turks. He defended Namur against the French, participated in the third partition of Poland, and was sent to Russia to engage the emperor Paul in a coalition against France. In 1799, he was in the Russo-Austrian army, and was seriously wounded before Tolona, Italy. He fought in the Tyrol against Napoleon, but was beaten by Lefebvre, May 13, 1800, and was compelled to fly to Hungary. When the Lombardo-Venetian kingdom was established, he was made governor of Venice.

**CHASTELLUX**, FRANÇOIS JEAN, Marquis de, 1734-88; a French soldier and author, distinguished in the seven years' war in Germany, and in the army of Rochambeau in

the American revolution, where he held the rank of maj. gen. His chief works are *De la Félicité Publique*; *Voyages in North America*; and a *Discourse on the Advantages Resulting to Europe from the Discovery of America*.

**CHASTE-TREE.** See VITEX.

**CHASUBLE** (Lat. *casula*, *casubula*, and *cassubula*), the uppermost garment worn by priests in the Roman Catholic church, when robed for the celebration of the mass. It was called also "the vestment," and under that name seems occasionally to have been used in the English Church after the reformation. Originally it covered the priest from head to foot, like a little house, whence some writers think it had its name of *casula*. In more recent times, at least, it was made of velvet. It was of an elliptical shape, like a *vesica piscis*, with a hole in the middle for the head; it had no sleeves. When put on, it showed two peaks, one hanging down before; another, on which a cross was embroidered, hanging down behind. According to Hildebert, the C. signified good works; according to Alcuin, charity; according to another writer, the unity of the faith. Durand makes one peak the symbol of love to God, the other peak the symbol of love to our neighbor. In France, the press or wardrobe in which chasubles were kept was called the *chasublier*.

**CHAT**, *Saxicola*, a genus of small birds of the very numerous family *sytiada* (q. v.), distinguished by a bill slightly depressed, and widened at the base. They have rather longer legs than most of the family. They are lively birds, flitting about with incessant and rapid motion in pursuit of the insects on which they chiefly feed. They are found in Europe, Asia, Africa, and New Holland. Three species are British—the stonechat, whinchat, and wheatear.—The yellow-breasted C. of the United States (*icteria polyglotta*) is a larger bird, and belongs to the family *turdida* or *merulida*.

**CHATARD**, FRANCIS SILAS, D.D., b. Baltimore, 1884; educated Mt. St. Mary's coll., Emmittsburg, Md., at the univ. of Maryland, and at the Urban coll., Rome. He was private chamberlain to Pope Pius IX.; rector of the American coll. at Rome; and was consecrated Rom. Cath. bishop of Indianapolis, Ind., 1878. He is the author of *Christian Truths*, and of various essays, discourses, and translations.

**CHÂTEAU**, CHATEL, or CASTEL, from the Lat. *castellum*, a fort, enters as a component part into many names of places in France.

**CHATEAUBRIAND**, FRANÇOIS AUGUSTE, Vicomte de, one of the most distinguished of French authors, was b. Sept. 14, 1768, at St. Malo, in Bretagne, and received his early education in the college at Rennes. While traveling in North America in 1790, he accidentally read in an English newspaper the account of the flight and arrest of Louis XVI. He immediately returned to France, intending to fight against the republic; but being seriously wounded at the siege of Thionville, in Sept., 1792, he escaped to England, where he lived in such poverty that he was compelled to make translations for the book-sellers, and to give lessons in French. In 1797, he published his first political essay, *Sur les Révolutions Anciennes et Modernes, considérées dans leurs Rapports avec la Révolution Française* (3 vols., London), a republican and sceptical work, the outcome of hardship, poverty, and sorrow. His skepticism soon vanished, but republican impulses continued to flash out at intervals during the whole of his strangely checkered, inexplicable, and inconsistent career. In 1800, C. returned to Paris, and wrote for the *Mercur de France*. In this journal, he first printed his tale of *Atala* (1801), with a preface lauding the first consul, Bonaparte. Its success was remarkable, but nothing to the marvellous enthusiasm excited by his *Génie du Christianisme* (1802), a work exactly suited to the jaded skepticism of the age, and also in accordance with the policy of the first consul, who was then concluding the concordat with the pope, and wished to make the Roman Catholic priesthood subservient to his measures. Bonaparte, therefore, appointed C. secretary to the embassy in Rome, and, in 1803, sent him as ambassador to the little republic of Valais. On the execution of the duke d'Enghien, Mar. 21, 1804, C. resigned in disgust. In 1806, he commenced his pilgrimage to the Holy Land, visited Greece, Palestine, Alexandria, and Carthage, and returned through Spain to France in May, 1807. From this period to the fall of Napoleon, he lived privately, publishing only two works of any value—*Les Martyrs* and the *Itinéraire de Paris à Jérusalem*. In 1814, his eloquent brochure, *De Bonaparte et des Bourbons*, excited such attention, that Louis XVIII. declared it was worth an army of 100,000 men in favor of legitimacy.

After the battle of Waterloo, C. returned to Paris, where he was made peer and minister of state. Gradually his monarchical zeal subsided, and, in his address, *De la Monarchie selon la Charte*, delivered in the chamber of peers, he gave expression to such liberal tendencies as offended the king, who erased his name from the list of his counselors. Soon, however, he appeared again as an ultraroyalist; and at the baptism of the infant duke de Bordeaux, C. presented to the duchess of Berry a flask filled with water from the Jordan. In 1822, he was appointed ambassador-extraordinary to the British court, but was rather rudely dismissed from office in 1824.

In 1826, C. prepared the first edition of his collected works, for the copyright of which the publisher gave the large sum of 600,000 francs, of which C. returned 100,000. During the days of July, 1830, he was staying with his friend Mme. Récamier at

Dieppe; but as soon as he heard tidings of the revolution, he hastened to Paris. He refused to take the oath of fealty to Louis Philippe. This political crotchettiness, which always rendered it impossible to know beforehand what course of conduct C. would adopt, is perhaps best explained by the following passage from his *De la Restauration et de la Monarchie Elective* (Paris, 1831): "I am a Bourbonist in honor, a monarchist on grounds of rational conviction; but in natural character and disposition, I am still a republican." In 1832, he revised a new edition of his works, and, after visiting the court of the expelled Bourbons, devoted his attention to the preparation of his memoirs, intended to be published posthumously (*Mémoires d'outre Tombe*), though considerable extracts were printed during his lifetime. He also found leisure to write several other works. He died July 4, 1848. See Sainte-Beuve, *Chateaubriand et son Groupe Littéraire* (1877).

C. wrote with warmth, energy, and a rich supply of imagery. Many of his descriptive passages are excellent, but his ideas want depth and coherency.—Marin, *Histoire de la Vie et des Ouvrages de M. de Chateaubriand* (3 vols., Paris, 1832).

**CHÂTEAUDUN**, a t. of France, in the department of Eure-et-Loir, is situated on the Loir, a tributary of the Loire, about 26 m. s.s.w. of Chartres. The streets are straight and well built, and an old castle, with an enormous tower, overlooks the town. C. has manufactures of blankets and leather. Pop. of commune, '91, 7147.

**CHÂTEAUGAY**, a s.w. co. in the province of Quebec, Canada, on the St. Lawrence, drained by the Châteaugay, the Noire, and other rivers; 250 sq. m.; pop. '91, 13,864. It is generally level, and the soil is fertile. Chief town, Ste. Martine.

**CHÂTEAUGUAY**, SEUR DE. See LE MOYNE.

**CHÂTEAUNEUF DE RANDON**, a village of France, in the department of Lozère, 12 m. n.e. of Mende. A pretty historical incident connected with the place, which was formerly fortified, makes it interesting. In 1390, the fortress, then held by the English, was besieged by the troops of Charles V., under the command of the gallant Du Guesclin. The English governor, sore pressed, promised to yield in fifteen days if no succor arrived. In the meantime, Du Guesclin died, and his successor was appointed, who, at the expiry of the fifteen days, summoned the governor to surrender. He refused to yield up the keys to any but Du Guesclin; and when informed of his death, marched out, and on bended knee laid the keys and his sword on the dead hero's bier.

**CHÂTEAUBOUX**, a t. of France in the department of Indre, situated on a rising ground in the midst of an extensive plain, on the left bank of the river Indre, 166 m. a. of Paris by railway. The town, which was formerly dirty and ill built, has been greatly improved within the last quarter of a century. C. does not possess much interest for the traveler. It is a busy place, with extensive woolen factories, besides manufactures of cotton, hosiery, yarn, hats, paper, parchment, hardware, leather. Pop. '91, 23,924.

**CHÂTEAUX-EN-ESPAGNE** (Fr. castles in Spain), romance castles; castles in the air; day-dreams.

**CHÂTEAU-THIERRY**, a t. in the department of Aisne, France, on the river Marne; pop. of commune, '91, 6863. It has a commercial college, a public library, and manufactures of linen, cotton, leather, and earthenware. There is a marble statue of La Fontaine, the fabulist. The town takes its name from a castle said to have been built by Charles Martel for Thierry IV., the ruins of which are on an adjacent hill. The position of Château-Thierry has subjected it to many disasters. It was captured by the English in 1421, by Charles V. in 1545, by the Spanish in 1591; pillaged in the Froude war in 1652, and suffered severely in the Napoleonic campaign of 1814.

**CHÂTEL**, FERDINAND TOUSSAINT FRANÇOIS, Abbé, 1795-1857; ordained as a priest in 1818, serving as vicar to several French towns, and as chaplain in the army. In 1831, he founded a new sect in whose doctrines Christ was to be venerated only as a perfectly good man, and the confessional, fasting, and vows of chastity and celibacy were to be omitted. The authorities interfered in 1842 and closed his place of worship, but in 1848 he appeared again as an especial champion of women's rights. His public meetings were suppressed in 1850, and he passed his later years in the duties of a metropolitan postmaster.

**CHÂTELAIN** (Fr. *chateau*, a castle). Literally the mistress of the castle, who carried her keys suspended from her belt by a chain of gold. In later times other articles were added, a watch, seal, vinaigrette, etc., attached by chains to an ornament at a lady's waist, hence called a châtelaine.

**CHÂTELET**, the name of two old fortresses of Paris, believed by some to have been built in the time of Julius Cæsar. The grand C. was restored by Louis IX. and remodeled by other kings. It was demolished in 1802.

**CHÂTELET-LOMONT**, GABRIELLE EMILIE, Marquise du, a very learned French woman, notorious for her intimacy with Voltaire, was born at Paris, 17th Dec., 1706. At an early period she displayed a great aptitude for the acquisition of knowledge. She studied Latin and Italian with her father, the baron de Breteuil, and subsequently betook herself with zeal to mathematics and the physical sciences. Distinguished alike for her beauty and talent, she soon found a host of suitors for her hand. Her choice fell on the marquis du Châtelet-Lomont, but her marriage did not hinder her from forming a *l'ami*

for Voltaire, who came to reside with her at Cirey, a château on the borders of Champagne and Lorraine, belonging to her husband. Here they studied, loved, quarreled, and loved again, for several years. In 1747, however, poor Madame C. became "not insensible to the brilliant qualities" of a certain M. Saint-Lambert, a capt. of the Lorraine guards; and the result was, that the philosopher had to make room for the soldier, and content himself for the future with being the "devoted and indulgent friend" of his former mistress. This new intimacy became fatal to Madame Châtelet. She died at Luneville, 10th Sept., 1749, a few days after having given birth to a child. Her first writing was a treatise on the philosophy of Leibnitz. She also translated the *Principia* of Newton into French, accompanying it with algebraic elucidations. It did not, however, appear till 1756, some years after her death. Her correspondence with Voltaire is interesting; but the fact that a woman so highly gifted as Madame C., and possessing so many amiable qualities, should never have dreamed that there was anything wrong in her *liaisons*, proves with terrible conclusiveness how corrupt was that philosophic society which, in the 18th c., professed to explode superstition and enlighten France and the world.

**CHÂTELHERAULT**, a t. of France, in the department of Vienne, situated on the river of that name, 18 m. n.e. of Poitiers. A handsome stone bridge, with a massive castellated gateway, built by Sully, at one end, connects it with a suburb on the other side of the river. C., which is an ill-built, mean-looking town, is one of the chief seats of the manufacture of cutlery in France, and since 1820 has had a national manufactory of swords and bayonets. Its river-port makes it the entrepôt for the produce of an extensive district. The duke of Hamilton derives his title of duke of Châtelherault from this place. Pop. of commune, '91, 22,522.

**CHATHAM**, a co. in s.e. Georgia, on the ocean and the South Carolina border; 433 sq. m.; pop. '90, 57,740, includ. colored. Co. seat, Savannah.

**CHATHAM**, a co. in central North Carolina, drained by the Rocky, New Hope, Deep, and Haw rivers; 784 sq. m.; pop. '90, 25,413. Co. seat, Pittsboro.

**CHATHAM**, the name of a township and of a village in Morris co., N. J. The village is on the Passaic river, and the Delaware, Lackawanna and western railroad, 23 miles from New York city, and 12 miles w. of Newark. It contains a public library, churches, clubs, waterworks, manufactories of tar paper and manilla paper, etc., and is the seat of an extensive rose culture. The roads in the vicinity are good and the scenery is picturesque. Many who do business in the large cities near by, have residences here. Pop. of the village about 1500; of the township, '91, 4681.

**CHATHAM**, a town in Barnstable co., Mass.; on the southeastern extremity of Cape Cod, and the New York, New Haven, and Hartford railroad; 18 miles e. of Barnstable; 80 miles s.e. of Boston; lat. 41° 40' 15" n.; long. 69° 56' 31" w. The town was founded in 1665, and incorporated in 1712, and contains the villages of North Chatham, Chathamport, South Chatham, and West Chatham, public library, churches, good public schools, including a high school. Two lighthouses are situated near the town, and fishing and navigation are the principal occupations of the inhabitants. Chatham has of late years become a fashionable summer resort. Population '90, 1954.

**CHATHAM** (Saxon, *Ceteham* or *Celtham*, understood to signify the "village of cottages"), a parliamentary borough, river-port, fortified town, and naval arsenal, in the co. of Kent, situated on the right bank of the Medway, at the upper part of its estuary, 30 m. e.s.e. of London. Much of C. is ill built and irregular. The High street is 1½ m. long, parallel to the river, and swarms with soldiers and Jews. The refuse timber of the dockyard is much used in building the house-walls. C. owes its importance to its naval and military establishments situated at Brompton village (on a height half a mile n. of C.); and on the Medway estuary. The C. fortified lines are the frequent scenes of field-operations, imitation battles, and grand reviews. Pop. '91, 31,711. The borough, which sends one member to parliament, is governed by a head-constable under the magistrates of Rochester. The Romans seem to have once had a cemetery here. Traces of Roman villas have been found, with Roman bricks, tiles, coins, and weapons. The dockyard was founded by Elizabeth before the threatened invasion of the Spanish Armada. In 1662 it was removed to its present site. In 1667 the Dutch, under De Ruyter, sailed up the estuary of the Medway, and, in spite of the fire from the castle, destroyed much shipping and stores. In a military point of view, the lines of detached forts connected with C. constitute a fortification of great strength; and the whole is regarded as a flank defense for London in the event of an invader seeking to march on the capital from the s. coast. The place is also defended by some strong forts on the Medway. In and near C. are a military hospital and strong fort; barracks for infantry, marines, artillery, and engineers; a park of artillery; a school for engineers; and magazines, store-houses, and depots on a large scale. In a naval sense, C. is one of the principal royal shipbuilding establishments in the kingdom, and a visit to it never fails to impress the stranger with a sense of the naval power of England. The dock-yard contains several building-ships and tide docks sufficiently capacious for the largest ships. One peculiar establishment in this dock-yard is a metal mill, which supplies all the royal dock-yards with copper sheets, copper bolts, and other articles in copper and mixed metal. The saw-mills at C. are very extensive. The actual workmen, artisans, and



laborers vary in number according to the amount of shipbuilding and repairing going on.

**CHATHAM**, a town in Northumberland co., N. B., on the Miramichi river, near its entrance into Miramichi bay; pop. '91, 5,000. It has a Roman Catholic cathedral, a college, and a temperance hall. It is a port of entry, and a summer resort, and has a large export trade in fish, lumber, etc.

**CHATHAM**, a town in Kent co., Ontario province, Canada, on the Thomas river, 47 m. e. of Detroit, Mich.; reached by the Great Western railroad, and by steamboats from the lakes. It is in a rich agricultural district, and has a large trade in grain and lumber. Pop. '91, 9062.

**CHATHAM**, a magisterial dist., Pittsylvania co., Va., including Chatham vill., traversed by Virginia Midland railroad. Pop. '90, 7394.

**CHATHAM, WILLIAM PITT**, Earl of, sometimes styled **PITT THE ELDER**, one of the greatest English orators and statesmen of the 18th c., was the son of a country gentleman, Robert Pitt of Boconnoc, in Cornwall; and was b. Nov. 15, 1708. After an education at Eton and Oxford, he traveled on the continent, and on his return obtained a cornetcy in the blues. In 1735, he entered parliament for Old Sarum—that synonym for electoral corruption—a borough then belonging to his family. He espoused the side of Frederick, prince of Wales, then at deadly feud with the king, and offered a determined opposition to Walpole, who was at the head of affairs. He was deprived of his commission in consequence—an insult and injury which only increased the vehemence of his denunciations of the court and the government. His influence, both in and out of the house of commons, increased rapidly; and Walpole, being driven from power, the king, notwithstanding his hatred of Pitt, found it necessary to allow of his admission to a subordinate place in the broad bottom administration; subsequently he was appointed to the lucrative office of paymaster-general. The duchess of Marlborough, pleased with his patriotism and powers of oratory, left him £10,000; and later, sir William Pynsent, struck with similar admiration, left him his whole property. In 1755, when Henry Fox (afterwards Lord Holland) was made secretary of state, finding himself opposed to the foreign policy of the new minister, Pitt resigned office as paymaster. In the following year, when the king, unwillingly acceding to popular demands, had to dismiss Fox, Pitt became nominally secretary of state, but was virtually premier. He immediately began to put into execution his own plan of carrying on the war with France. He raised the militia, and strengthened the naval power; but the king's old enmity, and German predilections, led him to oppose Pitt's policy, who thereupon resigned office in April, 1757, but was recalled in June, in obedience to the loud demands of the people.

Now firmly established in power, Pitt's war policy was characterized by unusual vigor and sagacity. Success returned to the British arms. French armies were beaten everywhere by Britain and her allies—in India, in Africa, in Canada, on the Rhine—and British fleets drove the few French ships they did not capture or destroy from almost every sea. But the prime mover of all these brilliant victories found himself compelled to resign (1761), when, on the accession of George III., and owing to the influence of lord Bute, it was attempted to introduce a vacillating policy into the government; his immediate cause of resignation being the refusal of the majority of the cabinet to declare war with Spain, which Pitt, foreseeing as imminent, wished to commence before the Spaniards were thoroughly prepared. As some recompense for his important services, Pitt received a pension of £3,000 a year; and his wife, sister of George Grenville, was created Baroness Chatham. Until 1766, Pitt remained out of office, not offering a factious opposition to government, but employing all his eloquence to defeat some of its most obnoxious measures. In that year he received the royal commands to form a ministry. He undertook the task, choosing for himself—to the astonishment of the public, and the sacrifice, to a considerable extent, of his popularity—the almost sinecure office of privy seal, with a seat in the house of lords as viscount Pitt and earl of Chatham. Ill-health prevented C. from taking any active part in this ministry, of which he was nominally the head, and which was weak and embarrassed throughout, and he resigned in 1768, to hold office no more. He did not, however, cease to take an interest in public affairs. He spoke strongly against the arbitrary and harsh policy of government towards the American colonies, and warmly urged an amicable settlement of the differences. But when, America having entered into treaty with France, it was proposed by the duke of Richmond to remove the ministers, and make peace on any terms, C., though much debilitated, came down to the house of lords, and in a powerful address protested against the implied prostration of Britain before the throne of the Bourbons, and declared war, with whatever issue, preferable to the proposed terms of peace. This address secured a majority against the motion, and the war was continued. But it was the orator's last effort; for, exhausted by speaking, on rising again to reply to a query addressed to him by the duke of Richmond, his physical powers suddenly failed, he fell back into the arms of his friends, and was carried from the house. He died May 11, 1778. He was honored with a public funeral in Westminster Abbey, where a statue was also erected to his memory at the public expense; and, in addition, government voted

£20,000 to pay his debts, and conferred a pension of £4,000 a year on his descendants. C.'s personal appearance was dignified and imposing, and added greatly to the attractions of his oratory, which was of the most powerful kind. His upright and irreproachable character demanded the admiration of his enemies; but his affectedness and haughtiness not unfrequently disgusted his friends, and pride rather than principle seems to have actuated his course at some important conjunctures of his life. He had, however, an intense love of country; the grand object of his ambition being to make his native land safe against all contingencies, and powerful among nations.

**CHATHAM ISLANDS**, a small group in the Pacific, lying about 400 m. due e. of the Canterbury settlement, on the Middle island of New Zealand, in lat. 43° 38' to 44° 40' s., long. 177° to 179° w., being thus almost precisely the antipodes of Toulouse, in France. They were discovered in 1791 by lieut. Broughton, both the cluster and its chief member taking the name of his ship. Chatham island is computed to contain 600,000 acres; a salt or brackish lake, however, of 20 m. in length, occupying the interior. The soil and climate of the archipelago, in general, are said to be good. Wheat yields abundantly; and the horses, cattle, and pigs which have been introduced thrive well. Timber of any size is unknown, so that the native canoe, instead of being cut out of a single tree, is merely wicker-work bound together by cordage of indigenous flax. The aborigines have two missions among them—one from Germany, and the other from New Zealand.

**CHATI**, a cat, *felis mitis*, smaller than the ocelot, and something like the leopard, a native of South America. It greatly annoys farmers by destroying fowls, birds, and smaller animals. Like all of the cat kind, it hunts mostly in the dark.

**CHÂTILLON**, a t. of France in the department of Côte-d'Or, on the Seine, about 45 m. n.n.w. of Dijon. Pop. '91, 5127. C. is chiefly famous on account of the congress of allied sovereigns held here in 1814, from Feb. 5 to Mar. 19, for the purpose of negotiation with Napoleon respecting conditions of peace. Several of the conditions proposed by the allies Napoleon could not bring himself to submit to, and the negotiations broke up, Mar. 19. On the 25th, when their armies were, in fact, marching on Paris, the allies from Vitry issued their declaration justifying a continuation of the war.

**CHAT MOSS**, a bog in Lancashire, the largest in England, about 7,000 acres in extent, and celebrated as having been the scene of the first great and successful efforts for the reclaiming of bogs, by Mr. Roscoe of Liverpool, in the end of the 18th and beginning of the 19th c., and of one of the great engineering triumphs of George Stephenson in the construction of the Liverpool and Manchester railway. It is situated between Liverpool and Manchester, at no great elevation above the sea. It is from 20 to 30 ft. in depth, and of such consistence that when an attempt was first made to survey it for the Liverpool and Manchester railway, the attempt was relinquished because of the impossibility of obtaining a sufficiently solid stand for the theodolite. Drains are filled up almost as fast as they are cut, by a pulpy stuff flowing into them, and affect only a few feet on either side. Great danger is experienced by any person stepping unwarily on the surface of the bog; and when he begins to sink, his struggles to extricate himself only cause him to sink faster and deeper. Mr. Roscoe's agricultural improvements were effected by numerous parallel drains in the parts on which he operated. The use of *pattens* by his workmen, and the adaptation of them to the feet of the horses employed, have been mentioned in the article Bog. The enlargement of the circle upon which a horse's foot rests from 5 in. diameter to 7, nearly doubles it, and consequently diminishes nearly by one half the pressure on each unit of surface. Mr. Stephenson, when he could find no one to countenance him in his views, calculated with confidence on the application of this principle to the railway, so that even the ponderous locomotive and train might be supported by a sufficient extension of the bearing surface; and thus he accomplished by spreading branches of trees and hedge-cuttings, and in the softest places rude hurdles interwoven with heather, on the natural surface of the ground, containing intertwined roots of heather and long grass; a thin layer of gravel being spread above all, on which the sleepers, chairs, and rails were laid in the usual manner. Drafts were at the same time cut on both sides of the line, and in the central part of the moss a conduit was formed beneath the line of railway, of old tar-barrels placed end to end. Notwithstanding difficulties which every one but himself deemed insuperable, Mr. Stephenson constructed the portion of the line through C. M. at a smaller expense than any other part of the railway. There still is "a sort of springiness in the road over the moss, such as is felt when passing along a suspension-bridge," and "those who looked along the moss as a train passed over it, said they could observe a waviness, such as precedes and follows a skater upon ice."

The complete reclaiming of C. M. for agricultural purposes can be only a question of time and expense. It seems capable of becoming one of the most productive tracts of land in England.

**CHATOYANT**, a term to denote the changeable internal light seen in some minerals, such as "cat's eye." See CAT'S EYE.

**CHÂTRE**, LA, a t. in the department of Indre, France, on the river Indre, 20 m. s.e. of Chateauroux; pop. 5000. There is a ruined castle, one of the towers of which is still used as a prison.

**CHATSWORTH**, the magnificent mansion of the duke of Devonshire, and one of the most splendid private seats in England, is situated in Derbyshire on the Derwent, 12 m. n. by w. of Matlock. William the Conqueror gave the domain to his natural son William Peveril. It was purchased by sir W. Cavendish in Queen Elizabeth's time. Sir W., in 1570, began the old mansion, which was finished by his widow, afterwards countess of Shrewsbury. In this building Mary Queen of Scots was imprisoned for 13 years. The present edifice, called a palace from its grandeur, includes the old Ionic pile, 183 by 172 ft. built 1687-1706, by the first duke of Devonshire, after designs by Talman and Wren. The façade is 720 ft. long, or with the terraces, 1200 feet. The grounds around are 9 m. in circuit, and are only surpassed by those at Versailles.

**CHATTAHOOCHEE**, a river of the United States, rises on the eastern declivity of the Blue Ridge of the Alleghanies, in the n. of Georgia; traverses that state in a s.w. direction; becomes the boundary between it and Alabama; and finally, after receiving the Flint from the left, crosses Florida, under the name of Apalachicola, into the gulf of Mexico. With an entire course of 560 m., it is navigable upwards as far as Columbus, 350 m. from the sea. It forms the principal outlet for the cotton crops of its basin.

**CHATTAHOOCHEE**, a co. in s.w. Georgia, on the Alabama border; 220 sq. m.; pop. '90, 4902, includ. colored. Agriculture is the chief business. Co. seat, Cusseta.

**CHATTANOOGA**, city and co. seat of Hamilton co., Tenn.; on the Tennessee River, 151 miles s.e. of Nashville. The city is finely situated on high hills among picturesque scenery. It was settled in 1836, and was originally called Ross's Landing. It was incorporated in 1851, and in 1863 was occupied by the union forces, and was almost destroyed during the war. It contains a handsome marble custom house, the Baroness Erlanger hospital, a public library, banks, a fine opera house, several large hotels, excellent public schools, Grant University (Methodist), the Chattanooga Female Institute, and the Chattanooga Medical College. The Chickamauga and Chattanooga National Military Park, laid out by the federal government on the site of the battle of Chickamauga, is east of the city, and was dedicated Sept. 19-20, 1895. Near it is the National Soldiers' Cemetery, one of the largest in the country, containing 13,000 graves. South of city is Lookout Mountain, from which there is a magnificent view extending to seven states. The Tennessee River is navigable most of the year from Chattanooga to the Mississippi, and nine lines of railroad pass through the city, making it the most important railroad centre in the South. The region is rich in coal, iron, marble, kaolin, and timber, and the city has developed very rapidly. In 1890 there were 294 manufactories, with an aggregate capital of \$7,405,646, employing 5741 hands, and the value of the products was \$10,216,109. Pop. '80, 12,872; '90, 29,100.

**CHATTANOOGA, BATTLE OF**. After the retreat of Rosecrans from the field of Chickamauga, Sept., 1863, the confederates under Bragg sent a cavalry force across the Tennessee above Chattanooga, and seized several points on the railroad in order to cut off his supplies. Shortly afterwards, Grant relieved Rosecrans and assumed command of the department of the Tennessee, Cumberland, and Ohio. Thomas was appointed commander of the department of the Cumberland, Sherman was assigned to the department of the Tennessee, and Hooker, with the 11th and 12th corps, which had been transferred from the army of the Potomac, was sent across the river to make a flank movement against Bragg, while a force under William F. Smith was thrown across the river at Brown's ferry, below Chattanooga, to seize the points of Lookout mountain that commanded the passage of the river. These measures, which were executed Oct. 27, 28, and 29, were successful in restoring the connection between the union army at Chattanooga and its depot of supplies. Sherman's army having arrived, the movement against the confederates was begun Nov. 23. Thomas's troops attacked and carried the enemy's first line of rifle-pits at 2 P.M., and held it during the night. The next day the attack was renewed along the whole line. Thomas strengthened himself in his advanced position, repelling every effort of the enemy to recover the lost ground. Sherman succeeded in carrying Missionary ridge, and Hooker, after partially carrying Lookout mountain, intrenched himself in a strong position, compelling the abandonment of the mountain by the enemy during the night. On the 25th the battle raged from dawn till dark. Missionary ridge, Lookout mountain-top, and all the rifle-pits in the valley, were carried by desperate fighting. The confederate army was routed, and pursued by Sherman and Hooker back to Georgia. The union loss was between 6,000 and 7,000 in killed, wounded, and missing. The confederate loss in killed and wounded is estimated at 2,500; in prisoners, 6,000. The effect of this battle was to cut off Bragg from communication with Longstreet, forcing the latter to abandon the siege of Knoxville and retreat into Virginia.

See the memoirs of Grant and Sherman, and the account, given in greater detail, in *Battles and Leaders of the Civil War* (1889-90).

**CHATEL** (Fr. *châtel*, old Fr. *chapitel*, from Lat. *capitale*, corrupted into *capitale* and *catallum*, meaning the capital or principal sum in a loan; hence goods in general, especially cattle, as distinguished from land), in the law of England, is a term used to designate any kind of property which, with reference either to the nature of the subject or the character of the interest possessed in it, is *not freehold*. Regarded from a positive

point of view, C. included not only all movable property, but all property which, though immovable, was not held on a feudal tenure. Any estate, then, or interest in lands and tenements not amounting to freehold, is a chattel. But as between property thus "savoring of reality" and mere personal movables—money, plate, cattle, and the like—there was a manifest distinction, chattels were, consequently, distinguished into *chattels-real* and *chattels-personal*. Both descriptions of C., in the eye of the ancient law of England, were regarded as inferior to freehold, and formed a subordinate class of property. As distinguished from estates of inheritance, or for life in things immovable, such estate is called *personal*, the others being *real* estate. Till the passing of 8 and 9 Vict. c. 106, livery of seizin was required to pass an estate of inheritance, or for life in corporal hereditaments of feu tenure, but such was no more required for the transfer of a C. real than of a C. personal. A C. *real* is also transmitted on the owner's death to his executor or administrator, like a C. personal, and does not descend to his heir like a freehold of inheritance. There is an exception to this rule, however, in the case of chattels which, owing to their intimate connection with property of a freehold nature, cannot be separated from it without injury. Such, for instance, are the muniments of title to an estate, growing grass, deer in a park, and actual fixtures, all of which go to the heir, and not the executor. The tenant of a C. real, like the tenant of a C. personal, is, moreover, said not to be *seized*, like the tenant of a freehold, but to be *possessed*. Lastly, there can be no estate tail in a C. real more than in a C. personal, except in the case in which either of them can be regarded as an heir-loom. Formerly, C. might be disposed of by will at an earlier age than real estates, but this was altered by 1 Vict. c. 26.

**CHATTERER**, a significant popular name, often applied to the birds of the family *ampelidæ*, a family of the order *insectores* and tribe *dentirostres*, having a depressed bill like that of the fly-catchers (*musciapidae*), but somewhat shorter and broader in proportion, and slightly arched. To this family belong the cotingas, wax-wings, piauhauas, caterpillar-hunters, etc. They are found chiefly in the warmer parts of the old world, although America also produces some. They inhabit low grounds or forests, feeding chiefly on insects and their larvæ. Some of them possess powers of song almost equal to those of the nightingale. Many of them are birds of gorgeous plumage.—Only one species is British, sometimes called simply the C., sometimes the Bohemian C., or wax-wing (q. v.).

**CHATTERTON, THOMAS**, an English poet, whose youth, genius, and tragical death have made him one of the wonders of English literature, was b. at Bristol, Nov. 20, 1752. His father, who had once been a chanter in the Bristol cathedral, and also master of a kind of free-school, died two or three months before the poet's birth. C. was educated at a parish-school, was considered a dull child, but, making acquaintance with a black-letter Bible which his mother often used, the dormant spirit flashed up. From early years he was fond of all kinds of antiquities; he clung around old walls like the ivy, and haunted twilight ruins like the bat. At the age of 14 he was apprenticed to Mr. Lambert, an attorney. His situation here was uncomfortable; he took his meals in the kitchen with the footboy, and, when refractory, was chastised with a ruler. In Oct., 1768, the new bridge at Bristol was opened, and C. sent to a newspaper an account, in antique phraseology and spelling, of the ceremonies attending the opening of the old one several centuries before—the whole purporting to be taken from an ancient MS. To a certain Bristol pewterer, Burgum by name, he presented himself, and astonished the craftsman by the sight of a parchment, in which his pedigree was traced back to the Norman conquest, adorned by many a splendid marriage, and many a knightly name. He also exhibited to his friends copies of old poems, which, he said, were composed by one Thomas Rowley, a monk of the 15th century. These matters made some stir in his native city, but not enough to satisfy C., who resolved to fly at higher game. Accordingly, Horace Walpole, at that time collecting additional materials for his *Anecdotes of Painting in England*, received from C. several pages of antique writing, accompanied by a short note. The pretended MS. gave biographical sketches of celebrated painters who had flourished in England several centuries ago, and of whose existence Walpole had never dreamed. Walpole, put off his guard, answered his unknown correspondent at once; expressed his delight at receiving the MS.; and desired, as a personal favor, that all the other antique writings, poems included, mentioned in the note, should be forwarded. C., highly elated, immediately sent accounts of a great many more painters and poets, and also gave some slight sketch of his personal history. On receipt of this second communication, Walpole suspected a trick. The poems he showed to Mason and Gray, who at once pronounced them forgeries; he then wrote C., expressing his suspicions as to the genuineness of the MS., and administering at the same time a great deal of excellent advice. C. replied, desiring that the MS. should be returned at once; but, by the time the letter reached London, Walpole was about to start for Paris, and it was allowed to remain unanswered. On Walpole's return some six weeks thereafter, a fierce note from C. awaited him, the contents of which must have brought the blood to his polished and urbane brow; indignant, he bundled up the MS., and returned it without a word of explanation.

From his earliest youth, C. had a ghastly familiarity with the idea of suicide. Among

his papers preserved in the British Museum, is a last will and testament, "executed in the presence of Omniscience, the 14th of April, 1770," full of the wildest wit and profanity. Another document of similar purport, falling into the hands of his friends, led to his dismissal from Mr. Lambert's office. Released from what he considered the slavery of law, C.'s eyes turned to London, and in that city he arrived, carrying with him all his Rowley MS. and several modern poems, on Tuesday, the 24th April, 1770, and took up his abode with one Walsley, a plasterer, in Shoreditch. No sooner had he settled there, than he began to work as with a hundred hands. During the last few months of his life, he poured forth squibs, satiric poems, political essays, burlettas, letters in the style of Junius, and meditated writing a history of England, to appear in parts. For a time, his prospects seemed golden enough. He obtained an introduction to lord mayor Beckford; he sent glowing letters home, accompanied by presents to his mother and sisters. Ultimately, he left the plasterer's in Shoreditch, and took lodgings in Brooke street, adjoining Holborn. Unhappily for C., editors of opposition papers were willing enough to insert and praise his articles, but were disinclined or unable to render an equivalent in cash. Possibly they conceived that a patriotism so ardent must be its own reward. The means of life were now fast failing. In desperation, he attempted to procure an appointment of surgeon's mate in a vessel going to Africa, but failed. This was the last drop that made the cup overflow. On Saturday, the 25th Aug., his landlady, alarmed that her lodger did not make his appearance, had the door of his room broken open; saw the floor littered with small pieces of paper, and C. "lying on the bed with his legs hanging over, quite dead." Just at this time, Dr. Fry of Oxford, who had seen or heard something of the Rowley poems, was on the eve of starting for Bristol to make inquiry into the matter. Sad enough to think on now: a little promptitude on the one hand, a little patience on the other, and the catastrophe might have been averted.

C. died before he reached his 18th year, and takes his place as the greatest prodigy in literature. Indeed, in our judgment of him, age cannot be taken into account. He never seems to have been young. His intellect was born fully matured. He was equally precocious in other respects. In his letters, he speaks of the relation of the sexes in the tone of a sated *roué*. He never seems to have felt the delicious shame and ingenuousness of youth; over his heart never was outspread "the bloom of young desire and purple light of love." The *Kew Gardens* is written in the style of Churchill, and it possesses all that master's vigor, and every now and then we come on a couplet turned with the felicity of Pope. His genius, however, is in its greatest perfection in the ancient poems. No poet, before or since, has written a tenderer strain than the lament in *Alia*, or conceived a bolder image than the personification of freedom in the ode to liberty in his *Tragedy of Godwin*. C.'s life has been written by many hands, but the best and most sympathetic sketch of it is that given by prof. D. Masson of Edinburgh university in his collected essays.—See *The Poetical Works of Thomas Chatterton*, by the Rev. Walter Skeat, M.A. (1875); Watt's essay, *English Poets*, series 1880.

**CHATTUGA**, a co. in n.w. Georgia, on the Alabama border, intersected by the C. river; 331sq.m.; pop. '90, 11,302, includ. colored. The surface is somewhat mountainous. Limestone, marble, lead, and iron are found; and wheat, corn, oats, and cotton are raised. Co. seat, Summerville.

**CHAUCEER**, GEOFFREY, the father of English poetry, was b. most probably about 1340, though the traditional date is 1328. Recent researches have made it clear that C. was the son of John Chaucer, a London vintner. It has been said that he studied at Cambridge, and afterwards removed to Oxford. While at the university, he wrote *The Court of Love*, and *The Book of Troilus and Cresseide*. At one period he seems to have turned his attention to law, and to have become a member of the Inner Temple. About these matters his biographers, knowing little, have conjectured much. The only particular of C.'s youth of which an anxious posterity can be certified is, that he one day thrashed a Franciscan friar in Fleet street, and was fined two shillings for the exploit on the next. History has preserved this for us, but has forgotten all the rest of his early life, and the chronology of all his poems.

In 1359, C. assures us, on his own authority, that he served under Edward III. in his French campaign, and was therein made prisoner. The date of his return from captivity, and of his subsequent marriage, cannot now be ascertained. He espoused Philippa, youngest daughter of sir Payne Roet, whose estates lay in Hainault. His wife's sister, Katherine, ultimately became the wife of John of Gaunt, duke of Lancaster; and it may be presumed that the high connection thus established aided, in no inconsiderable degree, the poet's advancement in life. After his marriage, he began to mix in public affairs. He was sent on an embassy to Genoa in 1373, and, on that occasion, has been supposed by some to have had an interview with Petrarch, then residing at Padua, and to have heard from his lips the story of *Griselda*. On his return, he was appointed controller of the customs for wools, and in the same year the king granted him a pitcher of wine daily for life. In 1377, C. proceeded to Flanders in the retinue of sir Thomas Percy, afterwards earl of Worcester; and for several years thereafter he was employed assiduously in embassies and other business connected with the public service. In 1386, a commission was issued to inquire into alleged abuses in the department of

the customs, and C. was dismissed from his controllership in the Dec. of that year. On meeting this fact, one cannot help remembering that Edward made the writing out of the accounts in C.'s own hand the condition of his holding office. Had the great poet neglected his duties? It has been conjectured by some, that after his disgrace C. became embarrassed in circumstances, and apparently with reason, for about this time he canceled both his pensions, and consigned them to one John Scalby, "to whom they were probably sold under pressure of distress," says his latest biographer. In 1387, C. lost his wife. Where he spent his closing years, cannot now be ascertained. Godwin surmises that in his distress he retired to Woodstock, and composed there *The Canterbury Tales*. It seems, however, to be tolerably certain that during the last years of his life he was resident in London. There he died on the 25th Oct., 1400, and was buried in Westminster abbey, the first of the long line of poets whose ashes make that pile so venerable.

C. was a worthy representative of the splendid 14th century. He was a master of the science, the theology, and the literature of his time. He had seen many men and cities, and had formed no inconsiderable unit in imposing ceremonies of state. His poems are numerous, and exhibit every variety of poetical excellence. His earlier performances, such as *The Flower and the Leaf*, *The Romaunt of the Rose*, are, after the French fashion then prevalent, gorgeous allegories full of queens and kings, bowers, beves of beautiful ladies, brave knights, and pious nightingales that sing the praises of God. They appeal potently enough to the eye, but they do not in the slightest degree touch the heart, or relate themselves to human concerns. Quite different *The Canterbury Tales*, so full of humor, pathos, and shrewd observation. In these tales, English life, as it then existed, is wonderfully reflected—when the king tilted in tournament, when the knight and the lady rode over the down with falcon on wrist, when pilgrimages bound for the tomb of St. Thomas passed on from village to village, when friars sitting in tavern over wine sang songs that formed a remarkable contrast with the services they so piously and sweetly intoned. All that stirring and gayly appareled time—so different from our own—is seen in C.'s work, as in some magic mirror; and in his case, as in every other, when the superficial tumults and noises that so stun the contemporary ear have faded away, leaving behind that which is elemental and eternal, the poet is found to be the truest historian. Among C.'s other writings may be mentioned, *The Book of the Duchess*; *The House of Fame*; and *The Legend of Good Women*. The genuineness of *The Court of Love* and of *The Flower and the Leaf* is denied by Mr. Furnivall, and by Mr. Skeat in his new edition of C. (4 vols., 1878). See J. R. Lowell's essay, in *My Study Windows*.

**CHAUCI**, an important tribe of ancient Germany, who dwelt between the Elbe and the Ems. Tacitus records that they were conspicuous for their love of peace and justice, being powerful but not ambitious, ready to resist aggression, but never provoking war. They finally merged into the wider designation of Saxons.

**CHAUDÉS-AIGUES**, a t. of France, in the department of Cantal, about 12 m. s.s.w. of St. Flour. It is celebrated on account of its hot mineral springs, which have the property of discharging grease from sheep's wool, and vast numbers of fleeces are sent hither annually to be washed. Pop. '91, 1674.

**CHAUDET**, ANTOINE DENIS, 1763-1810; a French artist, whose statue of *Oedipus*, finished in 1801, established for him a high reputation. He also excelled in designing and penciling; and illustrated the works of Racine for Didot. Among his statuary are "Paul and Virginia," "Sensibility," "Surprise," a silver statue of "Peace," and the "Napoleon" that crowned the Vendôme column. His wife, Jeanne Elizabeth Gabion, was his pupil in painting, and produced many fine pictures.

**CHAUDFONTAINE**, a village charmingly situated in the valley of the Vesdre, a few miles from Liège, in Belgium, and celebrated for a hot spring which supplies water for hot-baths. There are hotels and lodging-houses for the accommodation of visitors. The place is a favorite resort of the Liégeois. There is here a station on the railway from Liège to Aix-la-Chapelle. Pop. 2000.

**CHAUDIERE**, the name of a river and of a lake of Canada. The river joins the St. Lawrence from the s., about 7 m. above Quebec, forming the celebrated falls of its own name, about 2½ m. from its mouth. The lake—merely one of the many expansions of the Ottawa—has on its right the city of that name, the metropolis of the united colony.

**CHAUFFEURS**, or GARROTTEURS, outlaws during the French reign of terror who roamed over the country in organized bands, under the lead of Johann Buckler, or Schinderhannes. They garroted men and women, and roasted their feet to compel them to disclose treasure. In 1803, vigorous measures were taken which resulted in their suppression.

**CHAULIAC**, or **CHAULIEU**, GUI DE, a surgeon of France, of the 14th c., who was physician to three of the popes of Avignon. In his profession he was far in advance of the time, and his works are still regarded as important. He is credited with laying the foundation of the modern principles and practice of surgery. One of his works describes the plague or black death of 1348.

**CHAUMETTE, PIERRE GASPARD**, one of the most extravagant characters of the French revolution, was b., 1768, at Nevers, and made his first public appearance at the Cordeliers' club, where he was introduced by Camille Desmoulins. His "sans-culottism" gained for him such popularity, that he was appointed procurator of the community of Paris, in the place of Manuel. C. was very enthusiastic in favor of the "worship of reason." In his zeal, he rejected his own Christian name, Pierre, as having been sullied by saintly associations, and styled himself "Anaxagoras." The institution of the tribunal of the revolution, the decree for a revolutionary army, and the law against suspected aristocrats, were carried into effect by C. along with others. He also proposed that the whole French nation should be made to wear wooden shoes, and to subsist on potatoes; but this was too much even for the chimerical enthusiasm of his compatriots. His antics, however, in connection with the "worship of reason" excited the disgust of Robespierre, who devised measures for bringing the whole company of actors under Hébert to the scaffold. C. was arrested and imprisoned on a charge of having been implicated in a plot against the convention, and was executed, April 13, 1794.

**CHAUMONOT, PIERRE MARIE JOSEPH**, 1611-93; a French Jesuit missionary among the North American Indians. His work was chiefly among the Hurons of Canada, among whom he established missions and schools. He left a grammar of the Huron tongue. In 1655, he visited the Onondagas.

**CHAUMONT**, a t. of France, in the department of Haute-Marne, on an elevation between the rivers Marne and Suize, about 140 m. s.e. of Paris. It is generally well built, with clean, spacious streets, and fine promenades round the upper part of the town. There are considerable manufactures, including hosiery, cotton, yarn, gloves, etc. On the 1st of Mar., 1814, the allied powers here bound themselves by treaty against Napoleon, in the event of the negotiations at Chatillon ending unsatisfactorily. Pop. '91, 13,280.

**CHAUNCEY, CHARLES**, LL.D., 1777-1849; son of the Connecticut attorney-general, became a member of the Philadelphia bar, where he won high rank.

**CHAUNCEY, OR CHAUNCY, CHARLES**, LL.D., 1747-1828; a native of Massachusetts, admitted to the bar in 1768, and settled in New Haven. He was attorney-general of the state, and in 1789, judge of the superior court.

**CHAUNCEY, OR CHAUNCY, ISAAC**, 1772-1840; a capt. in the U. S. navy. He began sea-faring life in the mercantile service, in which he was conspicuous for enterprise and energy. In 1799, he entered the navy as a lieutenant, and in 1802 was made acting capt. commanding the *Chesapeake*, of 88 guns, the flag-ship of the squadron sent against Tripoli, serving with distinction in that brief war. In 1806, he was made capt., and in the war of 1812 had command on the great lakes. In 1813, he participated in the capture of York, now Toronto, and of Fort George, driving the enemy from the whole of Niagara region. On one occasion he captured five British vessels, and a regiment of troops. In Aug., 1814, he blockaded a British fleet in Kingston harbor until the close of navigation. Before the lake opened again, peace was concluded. In later years he was in command of the navy-yard at Brooklyn, and of the squadron that conveyed an officer to make the treaty of peace with Algiers. At the time of his death he was president of the board of navy commissioners.

**CHAUNCY, CHARLES**, 1705-87; great-grandson of the president of Harvard, a graduate of that institution, and pastor of the First Church in Boston in 1727. He published many works, among which were *Complete View of the Episcopacy*; *Seasonable Thoughts on the State of Religion in New England*; *Mystery Hid from Ages, or the Salvation of all Men*; and *The Benevolence of the Deity*. He officiated 60 years in one parish.

**CHAUNCY, OR CHAUNCEY, CHARLES**, 1592-1673; a native of England, educated at Cambridge, where he became professor first of Greek and afterwards of Hebrew. His puritanism involved him in difficulties with the ecclesiastical authorities, and he was fined and imprisoned. In 1638, he emigrated to New England, and was for three years pastor at Plymouth, Mass., and afterwards at Scituate. There having been a change in ecclesiastical policy in England, he was about to return to his vicarage in Ware, when Henry Dunster, the first president of Harvard college, resigned, and the place was offered to Chauncy. He at once accepted (1654), and remained in office till his death. He left six sons, all of whom graduated at Harvard, and all became preachers.

**CHAUNTER**, the highest pipe of the bagpipe, on which the chaunt, or melody, is played.

**CHAUNY**, a t. of France in the department of Aisne, about 18 m. w.n.w. of Laon. It is built partly on the right bank of, and partly on an island in, the river Oise, which is here navigable. It is an old, rather uninteresting place, with manufactures of sacking, hosiery, chemicals, and leather, and an active trade. Pop. of commune, '91, 9315.

**CHAUSSES**, in the armor of the middle ages, were defense-pieces for the legs. Some were made of padded and quilted cloth, with metal studs; some of chain-mail; some of riveted plates; and some of banded mail. It was not unusual to fasten them by lacing behind the leg.

**CHAUTAUQUA**, a co. in s.e.e. Kansas, formed 1875; drained by Big Caney and Middle Caney creeks, surface level and soil fertile; 651 sq.m.; pop. '90, 12,297. Co. seat, Sedan.

**CHAUTAUQUA.** This Indian word, the name of a lake and county in south-western New York, has during the past twenty years become associated with a system of popular education now generally known, but by many only vaguely understood.

The fundamental principle of this system is that the higher education may and should be extended to all, young and old, rich and poor, and that education, best begun in academy, college, and university, is not confined to youth, but continues through the whole of life.

Broadly speaking, the influence of Chautauque is two-fold, and is exerted through the summer assembly directly upon those in attendance, and by means of reading circles and correspondence instruction, upon self-educating readers and students in their own homes. These two plans may be successfully combined, for by supplementing home study during the year with six weeks' residence at Chautauque in the summer, a conscientious and persevering student may do work of a high grade.

The function of Chautauque in the educational system of the United States is compensatory and supplementary. While its methods cannot be by any means an adequate substitute for college training, they may stimulate personal development among ambitious people denied college opportunities, and among all classes may encourage habits of systematic reading and study.

**THE SUMMER ASSEMBLY.** The first Chautauque assembly (known as the "Sunday-School Assembly") was in session Aug. 4-18, 1874, as the result of a plan formed by Lewis Miller, Esq., of Akron, O., and Rev. John H. Vincent, of New York. Both men were interested in the improvement and development of Sunday-schools. To this end they devised a meeting which should be more than a mere conference of two or three days; but which should include courses of study in pedagogical principles, Biblical analysis, practical questions of school organization and management, extending over a period of ten days or two weeks. The plan also recognized the importance of recreative exercises, and certain lectures of a general character not strictly related to the main subject of Sunday-schools. It was decided to hold this "assembly" in camp, to adopt the unquestionably good features of the so-called camp-meeting, but to give prominence to the calm, earnest, careful study of important principles and methods. Although the plan originated with members of the Methodist Episcopal Church, there was no thought of making the assembly denominational. At the first session all the leading Protestant bodies were represented, and there has never since been any attempt to make distinctions. The attendance in 1874 was gratifyingly large. In spite of primitive lodgings and many discomforts, there was a spirit of enthusiasm which promised well for the success of the experiment. The Sunday-School Normal department provided means for daily study under experienced instructors; prominent speakers gave lectures of a popular character on Biblical themes. A large model of Palestine (800 feet long) was laid out near the lake (which served as the Mediterranean), and students were conducted through this miniature land by Oriental travelers. Thus the Chautauque assembly began, based on the theory that change of occupation, not idleness, is true recreation, and that the summer vacation may be made a means of development and stimulus to those engaged during the year in the ordinary pursuits of life.

The assembly plans widened rapidly in successive years. The system which had succeeded in the case of Bible study was quickly extended to include science, language (the teaching of Hebrew began in 1875), and literature. Music of a better grade was introduced, and a large chorus was drilled daily. This expansion has continued, until now the staff of lecturers and instructors numbers more than two hundred men and women prominent in all departments of educational life. Every year at least one well-known British scholar is induced to cross the Atlantic especially to lecture at Chautauque. Gradually progressive courses on some one topic have been substituted for miscellaneous addresses on a great variety of subjects.

In 1876 the session was lengthened to three weeks, and now covers nearly two months.

**SUMMER SCHOOLS.** In 1879 a school for secular teachers (Teachers' Retreat) was opened with a faculty of efficient instructors. This department has grown steadily in numbers and importance, and is a leading summer school of methods. The same year (1879) the School of Languages (now College of Liberal Arts) began, with courses in German, French, Latin, Greek, Hebrew, and Sanskrit. The development of this school has been marked by important changes, largely due to Dr. William R. Harper, of Yale, president-elect of the new University of Chicago, who became instructor in Hebrew in 1882, and principal in 1885. The college is organized for regular work under professors from Yale, Johns Hopkins, University of Michigan, and other leading institutions. Courses are offered in fourteen departments of language, literature, mathematics, science, history, and political economy. The languages are taught by the "inductive method," a combination of the "natural method" with the old-time thorough drill in the principles of grammar. The student is compelled, in all but a few exceptional cases, to confine his attention to one or two departments. By such concentration the summer student may easily accomplish in six weeks more than a college term's work in one study.

In 1888 THE CHAUTAUQUE SCHOOL OF THE ENGLISH BIBLE was organized with Dr. Harper as principal. This department, designed to promote the study of the Bible as a great literary masterpiece, as well as an inspired volume, was received with imme-



diate favor, and has grown rapidly. In 1890 the college and Bible school enrolled 768 students.

*Other Classes.* Besides the schools mentioned above, there are twenty classes in music, physical culture, art, etc.

Architecturally the summer city of Chautauqua has kept pace with the progress of the plan. All the schools and classes are provided with suitable buildings; there are public lecture halls of capacity varying from 200 to 5000, a well-equipped gymnasium, museum, etc. A large organ and a chime of eight bells are the permanent property of the assembly.

The revenue of the assembly is collected, like the customs dues of a foreign city, at the gates. No public "collections" are ever taken. A tax is levied on all who enter and become members of the community. Chautauqua carries the municipal idea beyond mere material matters to include public instruction and entertainment. All exercises, except class instruction in the college, are free to any one within the town limits.

**THE CHAUTAUQUA LITERARY AND SCIENTIFIC CIRCLE.** Probably Chautauqua is best known in connection with this plan of systematic home reading. In 1878 at Chautauqua this plan was proposed and explained. The announcement went out to the press, and the first year 7000 persons were enrolled. From that time, every autumn and winter, readers varying in number from 8000 to 25,000 have joined the circle.

The system was founded in the belief that thousands of ambitious people were only waiting for definite suggestion and aid in reading. The plan consists of: (1) A four years' course of reading, including selections in English from the ancient classics, history, economics, literature, and art. Each year of the four is devoted especially to a great nation, and is known as "The Greek Year," "The Roman Year," "The English Year," or "The American Year." No attempt is made to study language or mathematics. The course is general, and follows in a measure the subjects taught in the average college; it gives what has been called the "college outlook." (2) Certain books, many of them specially prepared by well-known authors, are designated each year by a council of six prominent men. (3) A monthly magazine, *The Chautauquan*, contains supplementary articles on the subjects of the course, by the leading writers of the day, general miscellaneous matter on current affairs, and several departments designed to aid the reader, such as apportionment of the course by the week or month; notes on the books, outlines of reading, word studies, etc. (4) A membership book, sent to each reader, includes analyses of the required books, and question papers (memoranda), to be filled out and returned to the office. These papers are intended to aid the reader in reviewing and systematically arranging the facts and principles he has learned. They are not examinations, nor are they regarded as such. (5) Local circles may be formed in any community where three or more readers desire the benefit of comradeship. There are about 2000 such circles now in active life (1890). (6) A certificate is granted at the end of the course to all who state in writing that they have faithfully read all the required literature. Such certificate has no significance beyond the fact stated, and, of course, has no relation to a degree. (See degrees below.)

The readers enrolling each year are known as a "class," and assume the numeral of the year their course is completed, after the plan of American colleges. This device, and the thought that so many people, in this country and in foreign lands, are reading the same books at the same time, create a certain spirit of fraternity and enthusiasm that contribute to the success of the plan.

For those who have completed the four years' course, or for others, there are many special courses in history, literature, science, and art, which enable a reader who has found a congenial subject in the general course to pursue a specialty. There is also a plan by which these special courses may be directed by correspondence with one or another college professor. The importance of continued reading is always emphasized.

**CORRESPONDENCE INSTRUCTION.** The general reading course arouses the intellectually apathetic, the special advanced courses offer opportunity for more thorough reading, and the Correspondence College makes real study possible. A number of college professors of unquestioned standing form the faculty, and by frequent communication, question papers, and other means, direct students in all academic branches. It is not claimed that this method is equal to personal contact between pupil and teacher. There is a loss which cannot be compensated, unless the correspondence student can attend the summer classes at Chautauqua or elsewhere. Yet, by devoting more time to the work than the student in residence gives, the persevering and conscientious non-resident student may acquire mental discipline and knowledge which deserve recognition.

The same correspondence plan is applied in the Chautauqua School of Theology, which enables ministers of limited means to continue and complete professional training.

**CHAUTAUQUA UNIVERSITY.** In 1884 the Chautauqua School of Theology was chartered by the New York legislature, and in 1882 a charter for Chautauqua University was granted. These powers were sought by Chautauqua, not for the sake of a specious dignity and authority, but because its officers believed that there should be in the United States an institution like the University of London, empowered to recognize with degrees the attainments of non-resident students, as shown by rigid and exacting examinations. The conservative policy of the management is proved by the fact, that in eight years less than a dozen degrees (the highest a PH.D.) have been conferred under both charters. No honorary degrees are possible under the rules.

**CHAUTAU'QUA**, a co. in w. N. Y., having lake Erie on the n. and Pennsylvania on the s. and w.; 1020 sq. m.; pop. '90, 75,303. Co. seat, Mayville.

**CHAUTAU'QUA LAKE**, in Chautauqua co., N. Y., 780 ft. above the level of lake Erie and 1883 ft. above the ocean. It is 18 m. long and 1 to 3 wide, with a navigable outlet to Alleghany river.

**CHAUVEAU**, PIERRE JOSEPH OLIVIER, D.C.L., b. Quebec, 1820. In 1844, he was chosen to the provincial legislature, became solicitor-general in 1851, and provincial secretary in 1853. In 1855 he was appointed superintendent of education for lower Canada. On the organization of the confederation, he became first minister of the government of Quebec, and in 1873 was chosen speaker of the Canadian senate. He became professor of Roman law in Laval University in 1878; was elected president of the Royal Society of Canada; and published poems and other works. He d. in 1890.

**CHAUVENET**, WILLIAM, LL.D., 1819-70; b. Penn.; a graduate of Yale, and long connected with Alexander D. Bache in magnetic and meteorological observations at Girard college. In 1841, he was appointed professor of mathematics in the navy, and assisted in the establishment of the naval academy at Annapolis and of its observatory, of which he was made director. He was for a time professor of mathematics and astronomy in Washington university at St. Louis, Mo. Among his works are *Manual of Spherical and Practical Astronomy*; *The Binomial Theorem of Exponents and of Logarithms*; and *Plane and Spherical Trigonometry*.

**CHAUVIN**, ETIENNE, 1640-1725; a minister of the reformed religion, b. at Nîmes. At the revocation of the edict of Nantes, he went to Rotterdam, and in 1695, he was made professor of philosophy at Berlin. His principal work is a *Lexicon Rationale, sive Thesaurus Philosophicus*. He also wrote *Theses de Cognitione Dei*, and started the *Nouveau Journal des Savants*.

**CHAUVINISM**. "Chauvin" was the name of the principal character in Scribe's *Soldat Laboureur*, played with immense success at the time of the restoration. He represented a bragging veteran of the empire, who was continually talking of his achievements at Austerlitz and Jena, and his determination to take a brilliant revenge for Waterloo. Since then, a *chauviniste* has come to mean a man who has extravagant and narrow-minded notions of patriotism, and enmity towards foreign peoples.

**CHAUX DE FONDS**, a t. of Switzerland, in the canton of Neuchâtel, 9 m. n.w. of the city of that name. It is situated in a bleak valley, at an elevation of 3070 ft. above the sea, and is scattered over a large area, almost every cottage being surrounded by a garden or croft. It is one of the chief seats of the manufacture of clocks and watches in the canton. The mechanists work chiefly at home, each devoting himself to a particular portion of machinery. This industry employs 12,000 hands. Pop. '80, 22,456.

**CHAVES**, a t. in Portugal, near the frontier, on a plain near the right branch of the Tamega, which is here crossed by an old Roman bridge of 18 arches; pop. 6000, but formerly as many as 20,000. Its hot saline springs were known to the ancients. In one of its churches is the tomb of Alphonso I.

**CHAYENPUE**, a fortified t. of Nepaul, in the n. of India, about 120 m. to the e. of Khatmandu, the capital of the state, being in lat. 27° 20' n., and long. 87° 3' east. It is the chief town of a district which yields rice, wheat, cotton, ghee or butter, timber, spices, sugar, tobacco, and pearls.

**CHAY ROOT**, CHOYA, or SAYAN (*oldenlandia umbellata*), a perennial herbaceous plant of the natural order *cinchonaceæ*, said to be a native both of India and of Mexico. It is cultivated on the coast of Coromandel for the sake of its long, orange-colored roots, the bark of which affords a beautiful red dye. The quality of the bark is said to be improved by keeping it for some years. It is the coloring matter obtained from C. R. which is used to paint the red figures on chintz. C. R. is the Indian madder, and in it some tribes in Ceylon formerly paid their tribute.

**CHAZELLES**, JEAN MATHIEU DE, 1657-1710; a mathematician and engineer; b. at Lyons. He was for some time employed by Cassini in measuring an arc of the meridian, and finally became hydrographic professor for the galleys at Marseilles. In 1689, he set sail from Rochefort with 15 galleys, cruised as far as Torbay, in England, and took part in the descent upon Teignmouth. C. published many maps and charts in the *Neptune Français*, and traveled to Egypt, where he measured the pyramids. He was made a member of the academy in 1695.

**CHAZY**, a town and village in Clinton co., N. Y., on the w. shore of Lake Champlain; the village on the Delaware and Hudson railroad; pop. of town, 1890, 2867. One of the mineral products of the township is the C. limestone, of the lower Silurian formation.

**CHEA'DLE**, a small but neat market-t. of England, in the moorland district of the n. part of the co. of Stafford, 14 m. n.n.e. of the town of Stafford, 3 m. from the Froghall station on the Churnet valley branch of the North Staffordshire railway, and 4 m. from the Blyth bridge station on the main line from Derby to Crewe. The town is

seated in a pleasant vale, surrounded by hills mostly planted with fir and other trees. The parish church (St. Giles) was a very ancient structure, but was rebuilt in 1837-38. A magnificent Roman Catholic church, erected at the sole expense of John, earl of Shrewsbury, was opened in 1846. Pop. '91, 8252.

**CHEATHAM**, a co. in n.w. Tennessee, on the Cumberland river; 400 sq.m.; pop. '90, 8845, includ. colored. Chief productions, corn, oats, and tobacco. Co. seat, Ashland City.

**CHEATING**. In the technical language of the English law, C. means the offense of fraudulently obtaining the property of another by any deceitful or illegal practice short of felony, but in such a way as that the public interest may possibly be affected. In order to constitute C., the fraud must be of such a kind as that it could not be guarded against by common prudence. C., in this sense, is an offense at common law, and indictable, which is not the case with imposition in a private transaction. The law of Scotland has no such distinction. See **WEIGHTS AND MEASURES, FALSE PRETENSES**. Cheating is defined in American law as "deceitful practices in defrauding or endeavoring to defraud another of his known right, by some willful device contrary to the plain rules of common honesty." Bouvier says: "In order to constitute a cheat or indictable fraud, there must be a prejudice received, or such injury must affect the public welfare, or have a tendency to do so." Courts have held that it is not indictable for a person to obtain goods by false verbal representations of his credit in society, and of his ability to pay for them; or to violate his contract, however fraudulently it may be broken; or fraudulently to deliver a less quantity than was contracted for and represented. To cheat one of his money or goods by false weights or measures has always been an indictable offense. The word "cheat" is not actionable unless spoken of a plaintiff in relation to his profession or business.

**CHEAT RIVER**, a stream in West Virginia, formed by brooks rising in the Alleghany mountains, flowing through a region rich in iron and coal, and joining the Monongahela in Fayette co. It furnishes abundant water-power, and is in some parts navigable for steam-boats.

**CHEBOYGAN**, a co. in n. Michigan, forming, with Emmett co., the extreme northern portion of the peninsula; 815 sq. m.; pop. '90, 11,986. Co. seat, Cheboygan.

**CHEBOYGAN**, city and co. seat of Cheboygan co., Mich.; on the Cheboygan river and the Michigan Central railroad; at the foot of the Straits of Mackinac. It has banking facilities, newspapers, and large lumbering interests. Pop. '90, 6235.

**CHECK** in England is a money order on any party having funds of the drawer. It must bear a penny stamp, and is payable to bearer on demand. If not presented within a reasonable time the holder shall not claim against the drawer should the banker fail. The banker bears the risk of forgery, unless facilitated by carelessness in drawing. A C. is held as payment of a debt until dishonored on presentation; it is not payable after the drawer's death.

No stamps are now required on checks in the U. S. The term is almost exclusively applied to the drafts used between banks and bankers and their customers. There is in this country a system of marking checks as "good" or "certified," by the banker. These are called "certified checks." The bank upon certification becomes a debtor to the holder, not the drawer. It has been decided in N. Y. that by certifying a check the bank engages, that the signature is genuine and that the maker has that amount of money in the bank which will be retained to meet that check.

**CROSSED CHECKS** are not known in the U. S. Where it is known to the maker that the payee wishes to deposit in a certain bank, the same effect as in a crossed check may be obtained by endorsing the check on its back for deposit in that bank.

**CHECK BANK**. See **CHEQUE BANK**.

**CHECKERBERRY**. See **GAULTHERIA**.

**CHECKERS**. See **DRAUGHTS**.

**CHECKY** (Fr. *écheté*). In heraldry, when the field or any charge is composed of small squares of different tinctures, generally metal and color, it is said to be checky.

**CHEDDAR**, a village in Somersetshire, on the s. side of the Mendip hills, 2 m. s.e. of Axbridge, with a level country to the south. It lies at the entrance of a deep rocky gorge, nearly 1 m. long, overhung by stupendous mural limestone precipices, containing caverns—one being 300 ft. long—filled with fantastic stalactites and stalagmites. The celebrated C. cheeses are produced on the rich grass-farms around. The church is supposed to have been built about 1400, and has a sculptured stone pulpit. Pop. of parish about 2,500.

**CHÉDOTEL**, the pilot of the expedition sent from France in 1598 to the coasts of Nova Scotia, under command of the marquis de la Roche. Arriving at Au Sable Island (90 m. s.e. of Nova Scotia, an uninhabited island 25 m. long by 1 to 1½ wide), 50 men were landed, and the ships departed for the mainland. But weather prevented a landing at the island on returning, and the men were left there seven years. In 1605, they were sent for, and 12 only were found alive.

**CHEDURA**, an island off Aracan, in the bay of Bengal, stretching from lat. 18° 40' to 18° 56' n., and from long. 98° 31' to 98° 50' e. Its area is about 240 sq.m., and its pop. 24,000. Along with the adjacent mainland, it was ceded to the British at the close of the first Burmese war. The soil is fertile, yielding rice, tobacco, sugar, indigo, cotton, hemp, and large quantities of a vegetable oil, equally fitted for burning and for varnishing. The principal mineral is petroleum. The coast presents earthy cones, which emit mud and gas, and about 100 years ago a severe earthquake is believed to have extended the limits of the island.

**CHEESE** is the common form in which the caseine (q.v.) of milk is used in a separate state as an article of food. In new milk, the C. is present in a condition soluble in water, and is generally separated therefrom in a coagulated or clotted form, on the addition of a little rennet (q.v.). In the preparation of C., the milk is gently heated to a temperature of 110° to 112° F., and placed in a large wooden tub, where the rennet is added, and the operation of curdling goes on. In about half an hour, the curd is sufficiently formed. The liquid whey being pressed out, the curd is chopped into small pieces of the size of a walnut with a knife, called a curd-cutter, salt is added, and the fragments of curd introduced into a cloth placed in a cheese-vat or chessart, which is a wooden tub of varying size and shape, perforated at the sides and bottom. The whole is then put under a cheese-press (q.v.), and subjected to great pressure, which consolidates the curd or caseine, and at the same time squeezes out the remaining portions of the whey. After two or three hours, the half-formed C. is turned and re-turned, each time being subjected to renewed pressure, till in about two days it is sufficiently compacted. It is then removed from the cheese-vat, and placed on a shelf in a dry, airy room, where, being repeatedly turned, it gradually dries, and gets aged or seasoned sufficiently for market in about six months. See *illus.*, *Dairy*, vol. IV.

When sufficiently dry for use C. still retains from 85 to 44 per cent. of water, and, besides the caseine, contains a greater or less proportion of oil or fat and saline matter—the latter mainly consisting of common salt, originally present in the milk, and also added during the manufacture of the cheese. As an article of diet C. is highly nutritious; but from its costive properties, it is mainly used as a condiment in small quantity after an ordinary meal, and is then serviceable in giving an impetus to the process of digestion. To serve the purpose of a digester C. must be old and partially decayed, or moldy. It then acts as leaven, and causes chemical changes gradually to commence among the particles of food which has previously been eaten, and thus facilitates the dissolution which necessarily precedes digestion.

Cheese is described according to the material used in its manufacture (skimmed milk, whole milk, cream, or a mixture); or according to the method of producing coagulation (spontaneously, or with rennet or acids); or according to the temperature maintained during the process of curdling, or with the manner of ripening, or according to the removal or non-removal of the whey. It may be well to mention briefly the best known cheeses and the distinctive peculiarity of each kind. Cheese made of whole milk includes all the best known English cheeses except *Oream*, *Cheddar*, and *Stilton*. These are the ordinary *Oream*, *Cheddar*, *Cheshire*, *Wiltshire*, *Gloucester*. The well-known Holland cheeses, *Edam* and *Gouda*, and the *Gruyère* of Switzerland (*schweizer käse*), are whole-milk cheeses. The peculiar taste of the Swiss cheeses is due to the herbs used in flavoring them. Full-cream cheese is made from cream-curds drained in a cloth. Of this kind are *Brie*, *Neuchâtel*, *Oream*, *Cheddar*, and *Yorkshire Stilton*. These in general should be eaten fresh. *Pot-Cheese* is made from the curd of sour milk, drained from the whey and made into molds. Hard cheeses are *Cheshire*, *Gloucester*, *Cheddar*, and *Dutch* or *Pineapple cheese*—the last named from the shape of the mold. Cheese made from skimmed milk becomes extremely hard. *Roguefort cheese* is made from goat's or sheep's milk. The ordinary cheese made in American factories is the whole-milk cheese. *Parmesan cheese* (made in Parma, Italy) is made from skimmed milk, the cows being allowed to eat only the finest herbage, and being housed all the year round. Of late, the foreign cheeses have been very successfully imitated in this country, many Swiss having settled here and opened dairies, especially in New Jersey and central New York. The German cheeses, particularly *Limbury*, are made in large quantities in Wisconsin, Ohio, New York, Pennsylvania, Massachusetts, and Michigan. Many farmers have ceased to manufacture C. in their own dairies. The milk is taken to large factories, where it is weighed and emptied into a common receptacle. The processes following are directed by trained superintendents, and the average product is greatly improved. The farmers receive either payment for the milk as brought, or a share in the proceeds of the manufacture. The total cheese-production of the United States is now fully 450,000,000 pounds annually.

**Cheese Press.** The old method of compressing curd and expelling the whey from it is still employed in some places—the mere piling of weights on the cheese-vat. Sometimes the action of a screw is employed. Among improved dairy implements are now reckoned, however, many ingenious and elegant forms of C. press, generally depending on the action of a lever. Such are Ouston's press and Frazer's horizontal gang-press. Pressing the milk ejects the whey and consolidates the curd into the desired form.

**CHEESE-HOPPER**, the larva of *piophilæ casei* or *tyrophaga casei*, a small dipterous (two-winged) fly, of the large family *muscidæ*, the same to which the house-fly, blow-fly etc.

belong. The perfect insect is about a line and a half in length, mostly of a shining black color; antennae, forehead, and some parts of the legs rufous. It is a pest of dairies and store closets, laying its eggs in cracks and crevices of cheese, the destined food of its larvæ. To preserve cheeses from this pest, it is of advantage to brush or rub them frequently, and to remove all cracked or injured cheeses from large stores, besides keeping them dry and in a well-aired place. The same rules are applicable to their preservation from the other insect larvæ by which they are sometimes infested, of which the most notable are those of the bacon beetle (see *DERMESTES*), and of another species of dipterous fly, *musca soricina*.

**CHEESE MITE.** See *MITE*.

**CHEESHANTRAUMUCK**, CALLEB, an Indian, b. 1646; the only aboriginal graduate of Harvard college.

**CHEE'TAH**, CHIT'TAH, or HUNTING LEOPARD, *Felis jubata* or *Cynailurus jubatus*, an animal of the feline family, but differing from all the rest of that family in its longer and narrower feet and less retractile claws, which are also more blunt and less curved. With these peculiarities are associated a greater length of limbs than is usual in feline animals, adapting it to take its prey by running rather than by leaping, and an intelligent and tractable disposition, constituting an additional point of resemblance to dogs; with which, however, the form of the head and the internal anatomy have nothing in common, but are entirely feline. The C. is in size about equal to a leopard, but the body and limbs are longer. It is very widely distributed, being found in Senegal, s. Africa, Persia, India, Sumatra, etc.

**CHEEVER, EZEKIEL**, 1615-1706; b. in England; came to New England in 1637, and assisted in founding New Haven colony, in which he became prominent as a deacon, a minister, and especially as a teacher. He also taught in Ipswich, Charlestown, and Boston, being at the head of the famous Latin School in Boston for 38 years. He prepared the *Accidence, a short Introduction to the Latin Tongue*, and wrote *Scripture Prophecies Explained, in three short Essays*.

**CHEEVER, GEORGE BARRELL**, D.D., b. Me., 1807; a graduate of Bowdoin college and Andover theological seminary, and in 1832 ordained pastor of a Congregational church in Salem, Mass. He began at an early age to write for the press, contributing prose and verse to the current magazines and quarterlies. The Unitarian controversy attracted his attention, and he wrote a defense of the orthodox system of Cudworth. Temperance also became a leading idea, and in 1835 he published in a Salem newspaper *Deacon Giles's Distillery*, a bitterly satirical allegory which had a wonderful popularity. The author was prosecuted, and sent to prison for a month. After some time passed in European travel he took charge of the Allen Street Presbyterian church in New York city, and soon afterwards gave a series of lectures on the "Pilgrim's Progress" and on "Hierarchical Despotism." After another trip across the sea he became the leading editor of the *Evangelist*, a weekly religious journal in New York, for which he had been a correspondent. In 1846, he became pastor of the Church of the Puritans (Congregational) in New York city, retaining that office until 1863, when the church, whose ground-lease had expired and which was weakened by dissensions, disbanded. His ministry there was amid the fierce debate which preceded the civil war of 1861-65. After that time he was not engaged in the active ministry, and resided at Englewood, N. J. He has written many essays and books, among which are, *Studies in Poetry; Lectures on the Pilgrim's Progress; Wanderings of a Pilgrim; Windings of the River of the Water of Life; Voices of Nature; Powers of the World to Come; God against Slavery; and The Guilt of Slavery and Crime of Slaveholding*. He d. in 1890.

**CHEEVER, HENRY THEODORE**, b. Me., 1814; brother of George B.; a graduate of Bowdoin, and correspondent abroad of the *Evangelist* of New York. He was a Congregational minister in New York, New Jersey, and Connecticut, and secretary and agent of the church anti-slavery society from its beginning.

**CHE-FOO**, or CHIFU, a seaport t. of n. China, on the s. coast of the gulf of Pih-chih-ti, in the province of Shantung, 80 m. e. of Tang-chow-foo. It was a place of small consequence until, under the treaty of 1858, it was opened to foreign trade as the port of Tang-chow. Pop. about 120,000.

**CHEHA'LIS**, a co. in western Washington, on the Pacific: 2104 sq.m.; pop. '90, 9249. Gray's harbor, one of the few places of refuge from the ocean, is in this county. Co. seat, Montesano.

**CHEIRAN'THUS.** See *WALLFLOWER*.

**CHEIROLOEPIS**, a genus of fossil ganoid fish, peculiar to the Devonian measures, in which eight species have been found. They had large heads, the spine continued in a rudimentary condition, and the body was completely covered with small lozenge-shaped ganoid scales. The first ray of each fin was converted into a strong spine, whose base was loosely imbedded in the flesh. The pectorals and ventrals were largely developed, while the dorsal was small, and situated behind the anal fin. The generic name, meaning "scaly-hand," was given in allusion to the large scaly pectorals.

**CHEIROMANCY** (Gr. *cheir*, the hand; *manteia*, prophecy), or *PALMISTRY*, a form of divination that professes to read the destiny of an individual by the lineaments of the

hand. In the middle ages, C. occupied the attention of Cardan, Paracelsus, and other eminent men, who elaborated it into a system. It is now, however, the exclusive property of the gypsies, who still find among maid-servants sufficient credulity to make its practice profitable.

**CHEIR'OMYS.** See AYE-AYE.

**CHEIRONECTES**, a genus of marsupial quadrupeds, differing from the opossums chiefly in having webbed-feet and aquatic habits. *C. palmatus* or *C. Yapock*, sometimes called the Yapock opossum, or simply the Yapock, from the South American river of that name, is common in many rivers of Brazil and Guiana. It has a soft woolly fur, the color of the upper parts of the body is gray, with large transverse patches of black, connected with a dorsal black line, the breast and belly white; the tail is long, very thick at the base, tapering to the tip, and, except at the base, covered with scales. The cheek-pouches are very large. Crustaceans are said to form the chief food of this animal, which is interesting as a sort of marsupial representative of the otter.

**CHEIROPTERA.** See BAT.

**CHEIROTHE'RUM**, the name given by Dr. Kaup to the animal which produced the peculiar hand-like impressions (hence the name, "hand-beast") on the triassic rocks of this country and Germany. The remains of the animal having been found, and its structure made out, this name has given place to the more characteristic one of *labyrinthodon* (q.v.).

**CHEKE**, Sir JOHN, who deserves to be remembered as one of the revivers of classical literature in England during the 16th c., was born at Cambridge, June 16, 1514. Entering the university of Cambridge, he devoted himself assiduously to the study of Latin and Greek, particularly the latter language, then much neglected in England. He labored earnestly to advance the study of the Greek language and literature; and when the first professorship of Greek was founded in Cambridge by King Henry VIII., about 1540, C. was appointed professor. A new mode of pronouncing Greek which he introduced was assailed by Bishop Gardiner, the chancellor of the university; but notwithstanding, C.'s system prevailed. C. was for a time preceptor of the prince, afterwards Edward VI., whose elevation to the throne secured him rank, wealth, and honor. But being a Protestant, he was stripped of everything when Mary came to the throne, although other lands were given to him on his returning to the Roman Catholic church, which he did to escape burning, the only alternative offered him by Cardinal Pole. His recantation preyed on his mind so much, that he died in the course of the following year, Sept., 1557. He left several works in Latin, and a pamphlet in English; and among his MSS. was a translation of the Gospel by Matthew, exemplifying a plan for reforming the English language by eradicating all words save those derived from Saxon roots.

**CHE-KIANG**, one of the eastern and maritime provinces of China, the smallest of the eighteen. Situated in the southern portion of the great plain, it is possessed of great fertility, and produces silk, tea, and rice in abundance. Its capital, Hangchow (q.v.), an important and populous city, is the metropolis of the silk districts. "Above is Paradise," say the Chinese; "below are Soo-chow and Hangchow." Both these places were taken by the Taeping rebels in 1860. Ning-po (q.v.) is the principal port of the province. Pop. according to the official returns of 1882, 11,588,692. Area, 89,150 sq. miles.

**CHELIC'ERÆ**, or antennal claws, modified antennæ, which, in some of the crustaceans, and in most of the arachnida, serve a purpose corresponding with that of the mandibles of insects in the cutting, tearing, or bruising of food. They move, however, up and down, in a direction contrary to that of the mandibles of insects.

**CHEL'IFER**, a genus of *arachnida* (q.v.) of the order *trachearia*, and of the family to which, from their resemblance to scorpions without tails, the name *pseudo-scorpions*, or false scorpions, has been given, the true scorpions belonging to the order *pulmonaria*. The genus C. consists of minute species in which this resemblance is very strong. The palpi are elongated and armed with pincers. The species live under the loose bark of trees, in chinks of old furniture, etc. One species, *C. cancröides*, about a line and a half in length, is frequently to be seen in old books, herbaria, etc., and is called the *book scorpion*; it is said to be useful as feeding on the insects which are most destructive to books and collections in natural history.

**CHELM**, or **CHOLM**, a t. of Russian Poland, in the government of the same name, 126 m. s.e. of Warsaw. It is the seat of a united Greek bishop, and has a theological seminary. The Poles were defeated here by the Russians, June 4, 1794. Pop. about 11,670.

**CHELMSFORD**, the co. t. of Essex, near the center of the co., at the confluence of the Chelmer and the Cann, 29 m. n.e. of London. The town contains factories for making agricultural implements, iron-foundries, breweries, grain-mills and electric-light plants. The town is the seat of assizes and local courts, and has a grammar-school founded by Edward VI. The streets are lighted by electricity. Pop. '91, 11,008.

**CHELMSFORD**, the Right Hon. **FREDERICK AUGUSTUS THESIGER**, Baron, was born in 1827. At the age of 17 he entered the rifle brigade, and in the following year was transferred to the grenadier guards as lieutenant, and in 1850 attained the rank of major; in 1857, of lieutenant-colonel; in 1863, of colonel; became brigadier-general in 1877, and lieutenant-general in 1882. He served in the Crimean war, in the Indian mutiny campaign, and again in the Abyssinian campaign of 1868. As commander of the forces in Cape Colony he subdued the Kafir. In 1878 he succeeded to the peerage. In the Zulu war of 1879 he was appointed to the command of the British troops, but was soon recalled; lieutenant of the Tower of London, 1884-89; general, 1888.

**CHELO'NIA** (Gr. *chelōnē*, a tortoise), an order of reptiles, corresponding in extent with the genus *testudo* of Linnaeus, and of which the most obvious distinguishing character is the inclosure of the whole body in a protective covering connected with the skeleton, so that only the head, the tail, and the limbs are protruded; the limbs, four in number, and all formed on the same plan, are used by some as feet for walking on dry ground, by others as paddles for swimming. The bony covering consists of two principal parts, called the *carapace* and the *plastron*; the carapace serving as a buckler for the upper parts, and the plastron for the under parts of the body. The carapace is formed from the ribs, of which there are eight pair, and from the annular parts of the dorsal vertebrae, expanded into plates, which are joined to each other by dentilated sutures, so that the whole acquires great firmness, and the dorsal vertebrae are rendered immovable. The plastron is formed of pieces which represent the sternum or breast-bone, and which are ordinarily nine in number. So compact and strong is the case of some of the tortoises, that it will bear immense pressure without injury, the arched form of the carapace adding to its strength; whilst the creature, destitute of other means of defense, and incapable of flight, finds safety, at least in its mature state, from all enemies but man, by drawing its head, tail, and limbs within the protecting case, which in some, called box-tortoises, has certain plates movable, so as more completely to inclose them. The turtles and other aquatic chelonians cannot thus withdraw their head, tail, and limbs from danger, but the greater activity of their movements compensates for this.

The firmly fixed ribs not admitting of the movements by which respiration ordinarily takes place in other vertebrate animals, the C. gulp down air, which they inhale entirely through the nostrils; first filling the cavity of the mouth by elevating the hyoid bone, and then, by depressing it, forcing the air into the lungs, whilst the inner aperture of the nostrils is closed by the tongue. In other respects, as to aëration and circulation of blood, they resemble other reptiles.

The jaws are not furnished with teeth, but act in a manner more resembling that of the mandibles of birds, being like them hard, sharp, and horny. The food of the C. is various. Some of them, among which are all the land-tortoises, subsist exclusively on vegetable food; some of the aquatic C. pursue and eat other aquatic animals.

All the C. are strictly oviparous. Their eggs are hatched by the heat of the sun alone; they lay a great number at a time, which are covered with a calcareous shell, like those of birds. The eggs of fresh-water tortoises are in some places a lucrative article of commerce, from the quantity of oil which is obtained from them.

The C. are found only in the warmer parts of the world, but their numbers in some places are astonishingly great. None of them can properly be reckoned British, although stray turtles have, in a few instances, been found on the British shores. A few species occur in the southern parts of Europe, and some are found in the temperate parts of North America.

All the species are extremely tenacious of life; they are capable of extraordinary abstinence, and of living long after having sustained injuries which would have been immediately destructive to almost any other animal. They are also remarkable for their longevity. See **REPTILES, TURTLE**.

**Fossil Chelonia**.—Foot-tracks on the triassic sandstone of Dumfriesshire were referred by their discoverer, Dr. Duncan, to tortoises. Similar tracks have been noticed in Devonian and oolite strata. Their vagueness, however, does not indicate with any certainty the animals which produced them. The first indisputable evidence of chelonian life occurs in the upper oolite, where the remains of several pond-tortoises and two or three turtles have been observed. In the newer deposits, they increase in number, so that between 70 and 80 species have been described from the tertiary strata. In the eocene deposits of the London clay, at the mouth of the Thames, there occur the remains of more species of true turtles than are now known to exist in the whole world. Some of these fossil C. were of a size proportioned to their colossal companions; as, for instance, the gigantic land tortoise (*colossochelys*) of the Sewalik hills, whose carapace was as much as 20 ft. in length.

**CHELSEA**, a city in Suffolk co., Mass.; pop. '90, 27,909, a suburb of Boston, with which it is connected by ferry, and electric and steam railroads. C. is separated from East Boston by C. creek, and from Charlestown by Mystic river, which is crossed by a bridge 3,300 ft. long. The principal public buildings, besides churches, are the city hall, the U. S. marine hospital, Soldiers' Home, Fitz Public Library, odd fellows' and masonic halls. C. is in the Boston customs district, and there are some manufacturing in the city; but the business of many of the inhabitants is in Boston. It has the

usual civic government of mayor, aldermen, and common council; with police, fire, and water departments, board of education, etc. C. was settled in 1630 under the name of Winnisimmet, and was a part of Boston until 1788, when, with adjacent settlements, it was organized as the town of C. It was incorporated as a city in 1857. The present towns of Winthrop and Revere were formed from a part of C. The principal manufactures are rubber goods, foundry and machine-shop products, curried leather, cordage, shoes, fire hose, brass goods, stoves and furnaces, tiles, pottery, etc.

**CHELSEA**, a suburb of London, in Middlesex, on the left bank of the Thames,  $4\frac{1}{2}$  m. w.s.w. of St. Paul's. The river is here crossed by a fine iron bridge. Many of the nobility and gentry formerly resided at C., and some of its coffee-houses were much resorted to by pleasure-parties in the 17th and 18th centuries. It contains the famous Chelsea Hospital (q. v.) for superannuated soldiers, also an asylum founded in 1801 for the maintenance and education of the children of soldiers. Since 1885 the limits of C. have been reduced. Pop. '91, 96,272.

**CHELSEA CHINA**, chinaware made at Chelsea, 1745-1784; its leading marks are an anchor or triangle.

**CHELSEA HOSPITAL** is an asylum for disabled or superannuated soldiers. The building was commenced in 1609, as a Protestant theological seminary, by Dr. Matthew Sutcliffe, dean of Exeter; and James I. gave it a charter in 1610, as *King James's college*. When Sutcliffe died in 1629, the building was less than half finished, and the students were only 15 in number. Shortly after this the scheme was abandoned, and the building used for various purposes. It was then rebuilt, and made into an hospital for disabled soldiers by Charles II. By a warrant issued in 1684, one day's pay per year, and two in leap-years, were deducted from soldiers' pay, for supporting C. H. This deduction has long ceased; the hospital being maintained by parliamentary grant. The hospital has accommodation for about 600 persons besides officers. Attached to it are about 40 acres of land, used as public gardens and exercise ground. It is governed by a board of commissioners, comprising *ex officio* the lord president of the council, the first lord of the treasury, and the secretaries of state; but the more immediate management is in the hands of about 120 persons, of whom 20 are military officers, 20 civil officers, and the rest subordinates.

The establishment is maintained for the *in-pensioners* of the British army, who are between 500 and 600 in number. These in-pensioners, besides board, lodging, clothing, washing, medical aid, etc., receive a small sum in money, varying from 5s. 8d. per week for a color-sergeant, down to 7d. per week for a private soldier. They are all dressed in uniform—red with blue facings—and are treated as a garrison, in respect to guards, sentinels, etc. There is a certain degree of choice open to the men, as to whether they will be *in* or *out* pensioners. The out-pensioners, who are more than a hundredfold as numerous as the others, receive sums of money varying from 1*½*d. to 3s. 10d. per day for life, as a reward for past services. Vacancies in the hospital are filled up once a quarter; and every person admitted must give up his out-pension before he can become an in-pensioner. The cost of maintaining the institution is very heavy, and doubts have frequently been expressed as to the usefulness of this expenditure.

**CHELTENHAM**, a municipal borough, parliamentary borough, and fashionable watering place in the co. of Gloucester, 8 miles n.e. of the city of Gloucester. It lies in a picturesque and healthful valley, on the Chelt, a small stream which rises in the adjacent hills, and flows into the Severn. It is sheltered on the e. and s.e. by a semicircle of the Cotswold hills. It is a very ancient town and in the 16th century sent two members to parliament, but was relieved from that burden in the reign of Queen Elizabeth. During the 18th century its prosperity increased, chiefly owing to the discovery of its mineral springs, of which there are several varieties. They are mainly saline with traces of iron and iodine. George III. visited C. in 1788, after which it continued to be a fashionable resort for many years. In 1893 an effort was made to restore the spas. The city has fine public promenades, gardens, terraces, and spacious squares. It has become famous for its colleges and schools, among which are: the grammar school founded in 1574, Cheltenham college, training colleges for school teachers, the Dean Close Memorial School, and many private schools. The Cotswold Hunt has its seat here and draws many visitors during the hunting season. There are schools of science and art, winter gardens, a fine public library, baths, and recreation grounds. Its growth during the 19th century has been very marked. In 1804 it had but one street, and contained 8076 inhabitants. According to the census of 1891, the population of the municipal borough was 42,000; of the parliamentary borough, 48,800. It returns one member to parliament.

**CHEM'IC**, is the name given to BLEACHING POWDER by those engaged in chemical works.

**CHEMICAL NOMENCLATURE AND NOTATION**. In early times chemical substances were named according to the fanciful theories of alchemy (q. v.). Thus the name *flowers*



of sulphur was applied to the sublimed sulphur, which grew or sprang like a flower from sulphur when heated; *spirit of salt*, to hydrochloric acid, the corrosive acid or spirit obtained from common salt; and a multitude of other names had a like fanciful origin. In 1787, Lavoisier founded the system of nomenclature which is followed still by chemists. At first, it was intended that the names of simple as well as compound substances should be regulated by system. Hence, such terms as oxygen (from *oeris*, acid, and *gennao*, to produce), the *acid-producer*, given from the notion then held that no acid was without oxygen; and hydrogen (from *hydor*, water, and *gennao*), the *water-producer*, from the supposition that hydrogen had more to do with the formation of water than any other element. The advance of chemistry, however, has so completely changed the opinion of chemists regarding the simpler bodies, that such names are now found to mislead; and thereafter, though such as had been given on this system were retained, their meaning has been discarded, and the systematized nomenclature restricted to compound substances. A remnant of the system, however, still subsists at the present time, in making the scientific names of all the metals end in *um*. In the non-metallic elements, a close analogy exists between chlorine, bromine, iodine, and fluorine; and to indicate this, the common termination *ine* has been given; and for a similar reason, carbon, silicon, and boron, end in *on*. As a general rule, however, the chemical name of an elementary substance does not convey any scientific meaning, and must be regarded as a simple mark or designation, analogous to the names of persons, which give no notion regarding their moral character or physical development. The ancient and more common metals retain their popular titles, such as gold, silver, and copper; but the more recently discovered metals have names given which end in *um*. The symbol of an element is obtained from the first letter of its Latin name, as O for oxygen; Pb for lead (Lat. *plumbum*). When the names of two or more elements commence with the same letter, a smaller letter or satellite is attached to one or more of these; such as S for sulphur, Se for selenium, and Si for silicon. For a complete table of the symbols of the elementary substances, see ATOMIC WEIGHTS.

The name of a compound substance generally indicates the elements of which it is composed. Thus the name oxide of iron indicates that the red powder (rust) is made up of oxygen and iron; the sulphide of lead (galena), that it is composed of sulphur and lead. In all similar combinations—

Oxygen	forms	oxides.
Chlorine	"	chlorides.
Bromine	"	bromides.
Iodine	"	iodides.
Fluorine	"	fluorides.
Nitrogen	"	nitrides.
Carbon	"	carbides or carburets.
Sulphur	"	sulphides or sulphurets.
Selenium	"	selenides or seleniurets.
Phosphorus	forms	phosphides or phosphurets.

When two elements combine with each other in more than one proportion or equivalent (see ATOMIC THEORY and ATOMIC WEIGHTS), the names of the compound bodies are contrived so as to express this. The term *protoxide* is applied to a compound of one equivalent of oxygen with one equivalent of another element; *deutoxide* to a compound containing a larger proportion of oxygen than the protoxide; and *tritoxide* when the oxygen is still further increased. The term *binoxide* is used when oxygen is present in the proportion of two equivalents to one equivalent of the other element; and *teroxide* when the proportion is as three to one. A *suboxide* contains less than one equivalent of oxygen; and a *peroxide* is the highest oxide not possessing acid properties. The same prefixes are applied to the compounds of chlorine, sulphur, etc.

When one element combines with another to produce several compounds possessing acid properties, various terminations are employed to distinguish the compounds. Thus, oxygen combines with a number of the elements to produce with each a series of acid compounds, the more *highly* oxidized of which receive the termination *ic*, whilst those containing *less* oxygen end in *ous*. Thus, sulphuric acid contains three equivalents of oxygen to one equivalent of sulphur; and sulphurous acid, two equivalents of oxygen with one equivalent of sulphur. These terminations are qualified by the use of the prefixes *hypo* (under) and *hyper* (over). Thus, *hyposulphuric* acid is applied to a compound containing less oxygen than the sulphuric acid, and *hyposulphurous* to one with less oxygen than sulphurous acid.

When acids combine with bases or metallic oxides to form salts, they produce compounds, the names of which are influenced by the terminations of the acids. Thus, sulphuric acid and soda form the sulphate of soda; sulphurous acid and soda, the sulphite of soda; and hyposulphurous acid and soda, the hyposulphite of soda. In the same manner, nitric acid with potash forms the nitrate of potash, whilst nitrous acid and potash produce the nitrite of potash.

If a symbol be employed alone, it represents one equivalent of the element. Thus, O signifies one equivalent, or sixteen parts by weight, of oxygen; C, one equivalent, or twelve parts by weight, of carbon; H, one equivalent, or one part by weight, of hydrogen. The

combination of two elements is represented by placing the symbols for those elements side by side; thus,  $\text{H}_2\text{O}$  signifies two equivalents of hydrogen and one equivalent of oxygen in a state of chemical combination (viz., water); and  $\text{NaCl}$  is one equivalent of sodium (Lat., *natron*), united with one equivalent of chlorine (viz., common salt).

When two or more equivalents of one element unite with one or more equivalents of another element, the number of such equivalents is signified by a small figure being placed immediately after the symbol of the element so multiplied. Thus,  $\text{H}_2\text{O}$  represents two equivalents of hydrogen in combination with two equivalents of oxygen (peroxide of hydrogen);  $\text{MnO}_2$  is one equivalent of manganese with two of oxygen (black oxide of manganese);  $\text{Fe}_2\text{O}_3$  is two equivalents of iron with three equivalents of oxygen (rust); and  $\text{Pb}_3\text{O}_4$  is three equivalents of lead with four equivalents of oxygen (red lead).

In expressing the formula of a compound substance, the symbol of the metal or its analogue is placed first in order, and is succeeded by the oxygen, chlorine, or similar element. Thus, the symbol for the chloride of mercury is always written  $\text{HgCl}_2$ , never  $\text{Cl}_2\text{Hg}$ . The same order is carried out in the construction of the formula of more complex substances; the metallic half is placed first. Thus, sulphate of iron—containing sulphuric acid and the oxide of iron—is always expressed as  $\text{FeSO}_4$ , never  $\text{SO}_4\text{Fe}$ . In other words, the symbols are written in the order in which the substances would be named in Latin.

In the construction of the formulas of complex substances, the comma (,) and plus sign (+) are often introduced; the former to separate the symbols of substances which are closely united together, and the latter to form a line of demarcation where the components are less intimately combined. Thus,  $\text{FeSO}_4 + \text{K}_2\text{SO}_4$  represents the compound of the sulphate of iron with the sulphate of potash;  $2\text{KCl} + \text{PtCl}_4$  is the double chloride of potassium and platinum.

Large figures placed at the left hand of a formula multiply all the symbols till a comma or plus sign appears. Thus,  $3\text{H}_2\text{SO}_4$  represents three equivalents of sulphuric acid;  $8\text{PbO}, \text{A}$  is three equivalents of oxide of lead, and one equivalent of acetic acid; and  $\text{K}_2\text{SO}_4 + \text{Al}_2(\text{SO}_4)_3 + 24\text{H}_2\text{O}$  (alum) is one equivalent of the sulphate of potash, with one equivalent of the sulphate of alumina, and 24 equivalents of water. When a compound substance requires to be multiplied, it is inclosed within parentheses, and a large figure placed immediately before it; thus  $3(\text{K}_2\text{C}_2\text{O}_4) + \text{Fe}_2(\text{C}_2\text{O}_4)_3 + 6\text{H}_2\text{O}$  represents three equivalents of oxalate of potash, one equivalent of oxalate of iron, and six equivalents of water.

In expressing the formulas of organic compounds, the symbols are written in the following order:  $\text{CHNO}$ . Thus, turpentine is  $\text{C}_{10}\text{H}_{16}$ , alcohol is  $\text{C}_2\text{H}_5\text{O}$ , and morphia is  $\text{C}_{17}\text{H}_{19}\text{NO}_3$ .

Arbitrary symbols are occasionally used to represent important complex substances. Cyanogen is known as  $\text{Cy}$ ; the organic acids are recognized by their initial letter with the sign (—) drawn above, as  $\text{T}$  for tartaric acid,  $\text{C}_4\text{H}_6\text{O}_6$ ;  $\text{A}$  for acetic acid,  $\text{C}_2\text{H}_4\text{O}_2$ ; and  $\text{O}$  for oxalic acid,  $\text{H}_2\text{C}_2\text{O}_4$ ; while the alkaloids are represented by their initial letter or

letters with the sign (+) above; thus,  $\text{Sr}^+$  for strychnine,  $\text{C}_{21}\text{H}_{22}\text{N}_2\text{O}_8$ ;  $\text{Mo}^+$  for morphia,  $\text{C}_{17}\text{H}_{19}\text{NO}_3$ ; and  $\text{Q}^+$  for quinine,  $\text{C}_{20}\text{H}_{26}\text{N}_2\text{O}_8$ .

Occasionally, in treatises on mineralogical chemistry, arbitrary modes of expressing the composition of minerals are resorted to, which it is not necessary here to explain.

**CHEMICAL TOYS**, which in the course of recent years have been brought prominently before the public, deserve a brief notice. "Pharaoh's serpents," which are described in the article **SULPHOCYANOGEN**, are highly poisonous, and during combustion evolve dangerous vapors. *Larmes du Diable*, or "crocodiles' tears," are formed of metallic sodium, burn with extreme violence if thrown into water, or even if moistened with water or heated, and scatter particles of caustic alkali, which may inflict serious burns. "Sunshine in winter evenings," "fiery swords," etc., are formed of magnesium, and, like the preceding, may cause serious burns. Pyroxylin, which is identical with gun-cotton, is the active agent in the various toys known as "will-o'-the-wisp paper," "parlor lightning," "fireflies," etc. The use of these toys in teaching rudimentary chemistry to children and young persons is quite incommensurate with their danger.

**CHEMISTRY** is that branch of natural science which takes cognizance of the changes that bodies undergo when they are influenced by affinity (q.v.). Changes that do not alter the nature and properties of substances—such as the falling of a body by gravity, or its expansion by heat—belongs to physics or natural philosophy. In chemical changes, again, the properties of the substances are permanently altered. Thus, when a piece of iron is left exposed to damp air, it is after a while converted into a reddish brittle substance (rust), owing to the union with it of the oxygen of the air. Chemistry, then, may be most simply defined as that branch of natural science which considers (1.) The combination of two or more substances to form a third body, with properties unlike either of its components; and (2.) The separation from a compound substance of the more simple bodies present in it: and considering that the steps of the combination and decomposition of substances can never be correctly understood without an intimate

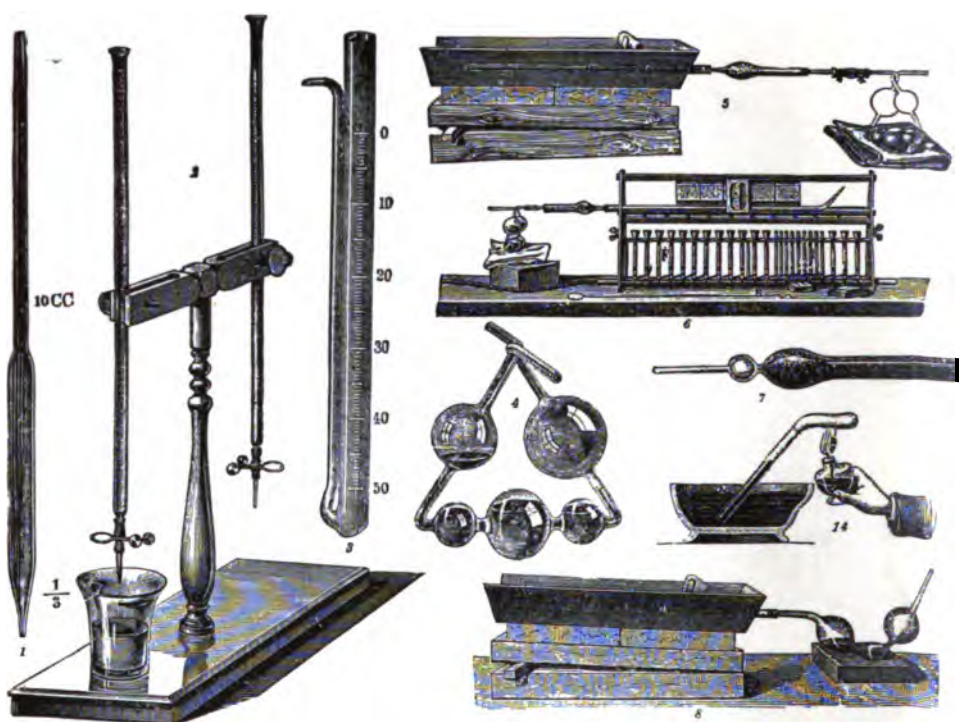
knowledge of the properties of substances, it follows that the science of C. must likewise take into notice the description of all the simplest as well as the most complex bodies. See ELEMENTS, CHEMICAL.

When the science of C. is considered as a whole, including the properties of all the elements or substances, and the combinations and changes which they can under all circumstances undergo, it is distinguished by the title of *pure, theoretical, or philosophical C.* Particular departments of C., where the science is confined to the examination of special objects, receive distinctive names; as *physical C.* or *chemical physics*, which considers phenomena bordering on natural philosophy and C.; *mineralogical C.*, which takes cognizance of the composition of minerals; *physiological C.*, which includes the changes which food undergoes in its transit through the animal economy, and the transformations that take place in organic substances generally; *medical C.*, which considers the composition and compounding of medicines; *agricultural C.*, which relates to the composition of soils and manures, the ingredients in plants, and the best modes of supplying the food they require, etc. *Inorganic or elementary C.* takes cognizance of mineral matter, and the changes it undergoes, whilst *organic C.* is the chemistry of the carbon compounds.

C. ranks as one of the arts as well as one of the sciences, and the division of *practical C.* comprehends the rules, processes, and mechanical means which must be adopted, for the successful prosecution of the art. Practical C. is subdivided into *analytical C.* (see ANALYSIS), which is occupied with the separation of simple substances from more complex—as chlorine (Cl) and sodium (Na) from the chloride of sodium or common salt (NaCl)—and to the estimation of the quantities of the several ingredients; and *synthetical C.* (see SYNTHESIS), which has for its object the union of simpler bodies to form more complex—as hydrogen (H) and oxygen (O) to form water ( $H_2O$ ). The art of *assaying* (q.v.) is a department of analytical chemistry. *Applied C.* includes the art of manufacturing the various substances employed in commerce and in domestic life, so far as chemical processes and application are required. It is subdivided into *technical C.*, which relates to everything connected with the arts and manufactures; and *pharmaceutical C.*, which takes cognizance of the substances used in medicine.

*History.*—The Egyptians appear to have possessed the greatest amount of chemical knowledge of all the nations of antiquity. They preserved dead bodies by embalming (q.v.), fixed colors in silk by means of mordants, prepared many medicines and pigments, as also soap, beer, vinegar, metals and metallic alloys, common salt, vitriol, soda, sal-ammoniac, glass, enamel, tiles, and painted earthenware. The Chinese were very early acquainted with the processes for dyeing, and the preparation of metallic alloys, the fabrication of niter, sulphur, gunpowder, borax, alum, porcelain, verdigris, paper, etc. From the Egyptians, the Greeks and Romans derived what chemical knowledge they possessed; but they added little or nothing; and when the migration of the northern tribes, and overthrow of the Roman empire, took place, a stop was put for a time to the advancement of all science in Europe. The prosecution of chemical knowledge was taken up by the Arabs before the 8th c., and was carried on by them and by their European scholars, the alchemists, with the results described under ALCHEMY. The first germs of a real science of C. seem to appear about the end of the 17th and beginning of the 18th c., in the speculations of Becher (q.v.) and the phlogistic theory of Stahl (q.v.). After this, C. rapidly advanced. In 1718, Geoffrey brought out the first table of *affinities*; in 1733, Boerhaave published many original experiments on the chemical relations of heat and light; in 1724 Hales, and in 1756 Black, published researches on the air and æriform bodies, showing that the carbonic acid evolved during fermentation, respiration, and by the action of acids on chalk, was different from atmospheric air. In 1754-59, Margraff added to the then known earths—lime and silica—two others, alumina and magnesia; he also extracted sugar from plants. In 1770, Priestley began to announce his discoveries of oxygen, ammoniacal, hydrochloric, and sulphurous acid gases, etc. In 1773-86, Scheele contributed chlorine, hydrofluoric, prussic, tartaric, and gallic acids; also baryta, phosphoric acid from bones, etc., and gave the first hints regarding a new doctrine of combustion. About the same time Bergman and Cavendish enlarged our knowledge of the gases. Lavoisier, between 1770 and 1794, reorganized much of the then known C., and founded a system of C. which still remains as the skeleton of the science. Berthollet, in 1787, contributed much to the doctrine of affinity, and made researches in chlorine, etc. Fourcroy and Vauquelin advanced organic C.; Klaproth gave many contributions to mineral C. Richter devoted himself to the doctrine of combining proportion, which was afterwards perfected by Dalton, as noticed under atomic theory (q.v.). The discovery of galvanic electricity by Galvani, and its advancement by Volta, led sir Humphry Davy, and others, to important researches in the metals and gases. Gay Lussac and Thenard advanced our knowledge regarding organic substances and the chemical relations of heat. Berzelius made laborious researches in mineral C., and gave an exactness to this department which is matter of astonishment to the chemists of the present day. He was also the author of the electro-chemical theory, which has been almost perfected by the labors of Faraday, De la Rive, Becquerel, etc. Organic C. has latterly advanced most rapidly under the researches of Liebig, Woebler, Mitscherlich, Mulder, Laurent, and others. See AFFINITY; ATOM; ATOMIC THEORY; ATOMIC WEIGHTS.

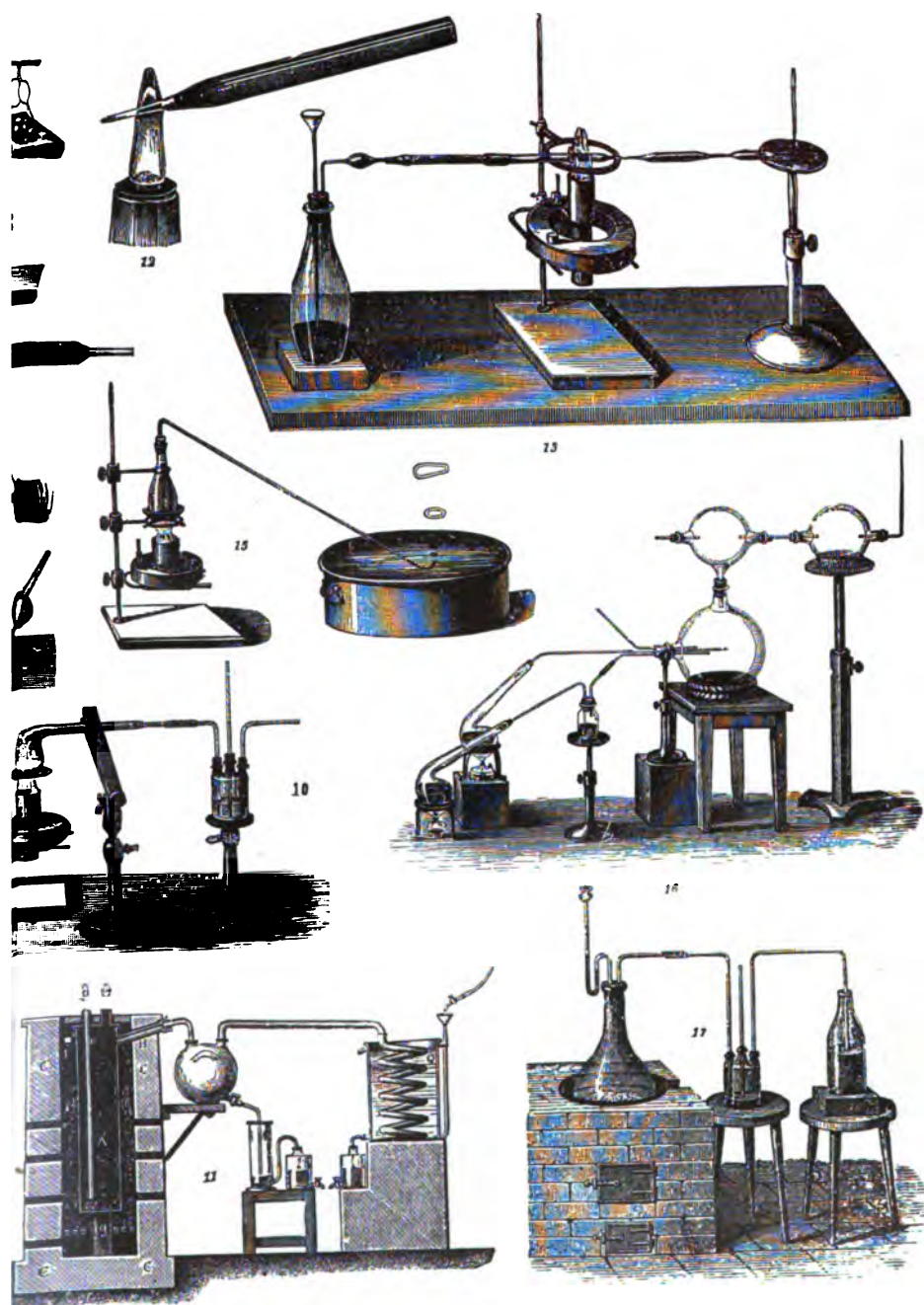




18

**CHEMICAL LABORATORY.**—1. Pipette. 2. Trituration tubes. 3. Burette. 4. Liebig's potash analysis. 7. Chloride of calcium tube. 8. Determination of nitrogen. 9. Production of 12, 13. Test for arsenic. 14. Decomposition of sulphuric acid gas. 15. Production of phosphorus (See article, Laboratory, Vol. VIII.)





ash apparatus. 5. Apparatus for organic analysis with carbon. 6. Gas-stove for organic  
ion of phosphate of calcium. 10. Production of nitrogen; 11, of sulphurated hydrogen.  
phosphoric acid gas; 16, of sulphuric acid; 17, of ammonia. 18. Interior of a laboratory.



It is impossible within the limits of this article to do more than briefly describe some of the most important of the numerous changes which have been introduced into the science of chemistry within the last few years.

1. The system of measuring temperature, lengths, weights, and volumes has been altered. The Centigrade has completely superseded the Fahrenheit thermometric scale in all recent chemical works, and the French metric (which is a decimal) system has been adopted for all measurements and weights, inches and their fractions being replaced by 10ths or 100ths of a meter, and grains by grams. It has this advantage over all the other systems, of possessing one fundamental linear unit, from which all the ramifications of linear, superficial, or solid dimensions, and of weight are derived. See METRIC SYSTEM. Chemists have long felt the want of an appropriate *volume*, with its corresponding weight, to serve as standard units of measurement, and prof. Höfman has selected 1 cubic decimeter = 1 liter, as the most appropriate unit of volume, and the weight of this measure of pure hydrogen as the unit of weight, hydrogen being taken at 0° C. temperature, and 0.76\* pressure. To this standard *weight-unit*, which = 0.0896 of a gram, he assigns the name of *crith*, from the Greek *κριθῆ*, a barley-corn, signifying figuratively a small weight; and the weight is now in universal acceptance amongst modern chemists. There is probably no figure in chemical science more important than this one (0.0896 of a gram) to be remembered and kept ready for calculation; for it is the standard multiple or co-efficient by means of which the weight of 1 liter of any other gas, simple or compound, is computed. "For example, the relative volume-weight of chlorine being 85.5, that of oxygen 16, and that of nitrogen 14, the actual weights of 1 liter of each of these elementary gases at 0° C. and 0.76 pressure, may be called respectively 85.5 *criths*, 16 *criths*, and 14 *criths*. So again with reference to the compound gases, the relative volume-weight of each is equal to half the weight of its product-volume. Hydrochloric acid (HCl), for example, consists of 1 volume of hydrogen + 1 volume of chlorine = 2 volumes, or by weight, 1 + 85.5 = 86.5 units; whence it follows that the relative value-weight of hydrochloric acid gas is 86.5

— = 18.25 units; which last figure therefore expresses the number of *criths* which 1

2  
liter of hydrochloric acid gas weighs at 0° C. and 0.76 pressure,  $18.26 \times 0.0896 = 1.6352$  as the actual weight in grams of hydrochloric acid gas. Again, as the product volume of water gas (H<sub>2</sub>O),† taken at the above temperature and pressure, contains 2 volumes of hydrogen + 1 volume of oxygen, and therefore weighs 2 + 16 = 18 units, the single

18  
volume of water gas weighs — = 9 units, or substituting as before the concrete for 2

the abstract value, 1 liter of water-gas weighs 9 *criths*; that is to say,  $9 \times 0.0896$  gram = 0.8064 gram."—*Op. cit.* p. 181. In concluding this subject we will only further remark, that when a closely approximative result suffices, the *crith* may be estimated at 0.09 gram.

2. Such terms as *atomic weight*, *atom*, and *molecule* are now employed in a stricter sense than formerly. Every element has been held from the time of Dalton to have a number called its atomic weight. This number, according to Dr. Frankland, one of our most distinguished modern chemists, is made to represent, as far as possible: 1st, The smallest proportion by weight in which the element enters into or is expelled from a chemical compound—the smallest weight of hydrogen so entering or leaving a chemical compound being taken as unity. 2d, The weight of the element in the solid condition which contains, at any given temperature, the same amount of heat as seven parts by weight of solid lithium at the same temperature. 3d, The weight of the element which, in the form of gas or vapor, occupies, under like conditions of temperature and pressure, the same volume as one part by weight of hydrogen."—*Lecture Notes for Chemical Students*, 1866, p. 2. Recent investigations have led chemists to assign to many of the elements double the atomic weights that were previously assigned to them.‡ Thus, taking as formerly the atomic weight of hydrogen as the unit, the atomic weight, or, as it is now often styled, the *atomic number* of oxygen is changed from 8 to 16, that of carbon from 6 to 12, that of sulphur from 16 to 32; and this doubling is by the latest writers extended to most of the elements except the halogens, nitrogen, phosphorus, boron, the metals of the alkalies, gold, and silver. The old atomic weights are still recognized as *combining* or equivalent numbers. The reason why this doubling of the number has been adopted will be presently given. The distinction between an *atom* and a *molecule* must be clearly recognized. "We may define an *atom* of an elementary body to be the smallest proportional weight thereof which is capable of existing in *chemical combination*; and we may define the *molecule* of an elementary body to be the smallest proportional weight thereof which is capable of existing in the *free or uncombined state*." This, which is Hofman's definition (*Modern Chemistry*, p. 157), is now generally accepted. Thus a molecule (or *elementary molecule*, as it is often termed) may consist either of an isolated atom, or of a group of atoms.

\* It is almost unnecessary to notice that 0.76 signifies 0.76 of a meter, or nearly 30 inches—the ordinary atmospheric pressure at the level of the sea, and at lat. 51½°.

† The reason why the formula H<sub>2</sub>O, instead of HO, for water is used, will be presently explained.

‡ The article "Atomic Theory" in the body of the work has been rewritten in accordance with the new views.



The bulk of a molecule, or the *molecular volume* of an element in the gaseous or vaporous state, is the same as the molecular volume of hydrogen at the same temperature and pressure, and in a large number of cases the *molecular weight* of an element is twice its atomic weight. Dr. Frankland gives the following list of the elements whose molecular volumes have as yet been determined: The molecules of mercury, cadmium, and zinc contain *one* atom, and are termed *monatomic molecules*; those of hydrogen, oxygen, chlorine, bromine, iodine, fluorine, nitrogen, sulphur, and selenium contain *two* atoms, and are termed *diatomic molecules*; the molecules of oxygen, as ozone, contain three atoms, or are *triatomic*; while those of phosphorus and arsenic are *tetra-atomic*, and those of sulphur under certain conditions are *hexatomic*. Thus an element, as in the cases of oxygen and sulphur, may, under different conditions, have two distinct molecular weights.

8. We shall now proceed to explain the reasons why many of the atomic weights have been doubled. "It is obvious," says Dr. Odling, in his elaborate article on "Atomic Weights" in *Watts's Dictionary of Chemistry*, vol. i. p. 456, "that the atomic weights of an element and of its combinations should be selected so as to express the entire series of combinations by the simplest series of formulæ; so as best to accord with the chemical properties and metamorphoses of the bodies; so as best to illustrate their analogies with other bodies; and so as to be in relation with their physical properties, such as their specific volumes, specific heats, isomorphism, etc." We shall endeavor to show how he applies these views to prove that, in the case of oxygen, 16 parts of that element, or the quantity thereof which unites with 2 atoms of hydrogen, is the smallest proportion of oxygen that can enter into a combination. "We find, in the first place," says Dr. Odling, "that the quantity of oxygen contained in the great majority of definite oxidized compounds must necessarily be represented by 16, or some multiple of 16 parts. Thus, the molecules of all hydrates, double oxides, acids, oxy-salts, aldehydes, ketones, alcohols, oxyacid-ethers, and a great number and variety of other compounds, doubtless forming together 99 per cent of all known compounds of oxygen, cannot be represented save with 16 parts, or some multiple of 16 parts of oxygen. For example, the molecules of *hydrate of potassium,\* benzoic aldehyde, acetone, chloral, hypochlorite of sodium,\** etc., each contain 16 parts of oxygen. The molecules of *spinelle, brown hematite, camphor, benzile, acetate of sodium,\* benzoic acid,* etc., each contain twice 16 parts of oxygen. The molecules of *nitric acid, glycerin, chlorate of potassium,\* salicylic acid, augite,* etc., each contain three times 16 parts of oxygen. We need not carry the quotation further, it being sufficient to remark that Dr. Odling gives similar lists of substances whose molecules each contain 4, 5, 6, 7, etc., times 16 parts of oxygen. Hence it follows that when two bodies only differ in composition by the different proportions of oxygen which they contain, that difference amounts to 16 parts, or some multiple of 16 parts of oxygen. This is well shown in the two following series of bodies given by Odling, in the former of which the symbols are arranged according to modern views:

KCl,	Chloride of potassium.	C <sub>2</sub> H <sub>4</sub> ,	Ethylene.
KClO <sub>2</sub> ,	Hypochlorite of potash	C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> ,	Aldehyde.
KClO <sub>2</sub> ,	Chlorite of potash.	C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> ,	Acetic acid.
KClO <sub>3</sub> ,	Chlorate of potash.	C <sub>2</sub> H <sub>4</sub> O <sub>3</sub> ,	Glycolic acid.
KClO <sub>4</sub> ,	Perchlorate of potash.	C <sub>2</sub> H <sub>3</sub> O <sub>4</sub> ,	Glyoxylic acid.

It is obvious that in both these series each term differs from the preceding one simply by O<sub>2</sub>, or 16 parts of oxygen. Again, the quantity of oxygen which can be liberated by any reaction, and which, either alone or in the form of water, can be added to or separated from a compound, must be 16, or some multiple of 16 parts. Thus, each molecule of nitrate of soda, NaO.NO<sub>3</sub>, when decomposed by heat, yields nitrate of soda, NaO.NO<sub>3</sub>, and O<sub>2</sub> (or 16 parts of oxygen); similarly, each molecule of permanganate of potash, when decomposed by sulphuric acid, yields manganese alum, and O<sub>2</sub> (or twice 16 parts of oxygen); and each molecule of chlorate of potash, KO.ClO<sub>3</sub>, is decomposed by heat into chloride of potassium, KCl and O<sub>2</sub> (or three times 16 parts of oxygen). Again, water (and consequently its main constituent, oxygen) is always eliminated in double or some higher even atoms. Thus, formic acid, C<sub>2</sub>H<sub>2</sub>O<sub>4</sub>, yields carbonic oxide, C<sub>2</sub>O<sub>2</sub>, and two atoms of water, H<sub>2</sub>O<sub>2</sub>; alcohol, C<sub>2</sub>H<sub>6</sub>O<sub>2</sub>, yields olefant gas, C<sub>2</sub>H<sub>4</sub>, and two atoms of water, H<sub>2</sub>O<sub>2</sub>; oxalate of ammonia, NH<sub>4</sub>.C<sub>2</sub>HO<sub>4</sub>, yields cyanogen, C<sub>2</sub>N<sub>2</sub>, and four atoms of water, H<sub>2</sub>O<sub>4</sub>; and innumerable additional examples might be given. On these grounds (and many additional ones might be adduced if space permitted) it becomes obvious that if the vast majority of oxidized bodies were correctly formulated, they would be represented more simply by the formulæ in which O = 16 than by the formulæ in which O = 8. Reasons of a similar nature have led to the duplication of the atomic weight of carbon, sulphur, and many of the other elements. There must obviously be some means of distinguishing when O indicates 8 or 16 parts of oxygen, C indicates 6 or 12 parts of carbon, etc. Various modes of distinction have been adopted by different chemists. In *Watts's*

\* In these cases, one of the new forms of nomenclature is introduced.

*Dictionary of Chemistry* (published between 1863 and 1868), the new atomic weights are represented by the same symbols which have hitherto been adopted for the old weights; while the latter (when they are occasionally introduced) are printed in italic capitals; thus water is represented by  $H_2O$  in the new and by  $HO$  in the old system, acetic acid by  $C_2H_4O_2$  in the new and by  $C_2H_2O_2$  in the old system, etc. A more common means of indicating when the value of the symbol of an element is doubled in value is by drawing a horizontal bar through it, a notation due to Berzelius; thus,  $\bar{C}$ ,  $\bar{O}$ ,  $\bar{S}$  represent respectively an atom of carbon, of oxygen, and of sulphur in the new system. This system is useful in forming, as it were, a bridge to facilitate the passage from the old to the new system, and will gradually disappear when all chemists recognize the doubled atomic weights. Naquet, Miller (in the 8d edition of his *Chemistry*, 1864), and others, adopt this barred system, and the latter frequently gives the formulæ pertaining to both systems; for example,  $FeO, SO_4.HO.6HO$ , or  $FeSO_4, H_2O.6H_2O$ , represents the composition of the crystallized sulphate of protoxide of iron often described as protosulphate of iron.—*Inorganic Chemistry*, 8d ed., p. 6. Some writers, as Frankland, in his *Lecture Notes for Chemical Students*, 1866, following the plan of Watts and the contributors to his dictionary, unreservedly adopt the doubled atomic weights, and represent them by the old formulæ; thus  $O$ ,  $C$ , and  $S$  represent in these works precisely double the weight of oxygen, carbon, and sulphur that these capitals represent in the 1st and 2d editions of Miller's *Chemistry*, Fownes's *Manual of Chemistry*, and other standard works published a few years ago. It is now customary for the writers of chemical papers who object to the barred symbols as being unseemly, to insert at the commencement  $C = 6$ ,  $O = 8$ , or  $C = 12$ ,  $O = 16$ , in order that the reader may be able to recognize which system is adopted.

*Chemical Nomenclature* is still in an unfinished state. The chemists of all countries are, with one notable exception, agreed as to the names and symbols which should represent the different elements. The French chemists persist in designating nitrogen by the name of *azote*, and of using  $Az$  instead of  $N$  for its symbol; and in Italy the term *azoto* is still employed, but as it is often coupled with the symbol  $N$ , it will probably soon be exchanged for the more general term nitrogen. When two elementary bodies unite together, they form a *binary compound*. The nomenclature of the binary compounds is in a transitional state. The compounds of sulphur with metals used to form *sulphurets*, latterly they have been termed *sulphides*, and now they are denominated after a third fashion; sulphuret of potassium (for example), after having been for some years sulphide of potassium, now being termed *potassic sulphide*. In order to obtain uniformity, the following rule is adopted by the representatives of the modern school. The names of binary compounds are formed from those of their constituents, the English or Latin name of the positive constituent with the terminal *ic* preceding that of the negative constituent, which is made to end in *ide*. Thus: potassium and sulphur form potassic sulphide; sodium and oxygen form sodic oxide (formerly soda or oxide of sodium); silver and chlorine form argentic chloride (formerly chloride of silver); lead and iodine form plumbic iodide (formerly iodide of lead); calcium and chlorine form calcic chloride (formerly chloride of calcium), etc. When the same elements form two compounds, the one which contains the smallest proportion of the negative element is distinguished by changing the terminal syllable of the name of its positive constituent into *ous*, while the terminal *ic* is retained for the compound containing the larger proportion of the negative element. Thus, 1 atom of iron and 1 atom of oxygen form *ferrous oxide* (the old protoxide of iron); 2 atoms of iron and 3 atoms of oxygen form *ferric oxide* (the old peroxide of iron). Sometimes the same elements form more than two compounds with one another, and then the prefixes *hypo* and *per* are employed. When a binary compound contains oxygen, and becomes an acid when made to unite with water, or becomes a salt when united to a base, it is termed an *anhydride* (q.v.) or *anhydrous acid*. Thus 1 atom of carbon and 2 atoms of oxygen form *carbonic anhydride*, formerly known as carbonic acid gas; 1 atom of sulphur and 3 atoms of oxygen form *sulphuric anhydride*, etc. In a considerable number of cases, the trivial or common name has not been displaced by the new systematic name; thus water, ammonia, hydrochloric acid, phosphureted hydrogen, sulphureted hydrogen, etc., are not as yet replaced by hydric oxide, hydric nitride, hydric chloride, hydric phosphide, hydric sulphide, etc.; and soda and potash are still preferred by some chemists to sodic and potassic hydrates.

The term *acid* was originally applied only to substances which, like vinegar, possessed an acid taste; it is now made to include a large number of compounds which do not possess this property. The most general definition of acids is that of Gerhardt, which is adopted in Watts's *Dictionary of Chemistry*—namely, that "acids are salts of hydrogen." A more intelligible definition to ordinary readers is that which is adopted by Frankland, in which an acid is described "as a compound containing one or more atoms of hydrogen, which become displaced by a metal when the latter is presented to the compound in the form of a hydrate." Thus, using the new nomenclature and atomic weights, nitric acid and sodic hydrate, yield sodic nitrate and water—



in which reaction the hydrogen of the nitric acid is displaced by the sodium of the sodic

hydrate (or soda), and as only *one* atom of hydrogen is displaced, nitric acid is said to be *monobasic*. When an acid admits of the displacement of two atoms of hydrogen, it is termed *dibasic*—as tartaric, oxalic, and, according to recent views, sulphuric acid; and when three atoms can be replaced—as in the case of common phosphoric acid,  $\text{H}_3\text{PO}_4$ , in which H, may be displaced by K, or Ag, the acid is termed *tribasic*. The nomenclature of the compounds of acids with bases is still unfixed. The names of the alkali-metals (potassium, sodium, and lithium) and alkaline-earth metals (barium, calcium, etc.) are now commonly substituted for those of their oxides in the nomenclature of the corresponding oxygen salts—as, for example, *carbonate of sodium* and *sulphate of calcium* for carbonate of soda and sulphate of lime. The names of these bodies are thus brought into uniformity with those of the salts of iron, copper, etc. In Watts's *Dictionary* and Frankland's *Lecture Notes* such compounds are denominated *sodic carbonate*, *calcic sulphate*, *sodic nitrate*, etc., and these terms will doubtless soon be generally adopted for the metallic salts of the oxygen-acids generally. The nomenclature of complex inorganic bodies is founded, for the most part, on the theory of types, the names of particular compounds being obtained from the name of the type by prefixing to it adjectives which express the nature of the element by which the hydrogen of the type is replaced and the number of atoms of it contained in one molecule of the compound. By way of illustration, we give a simple and a complicated example:

$\text{Bi} \left\{ \begin{smallmatrix} \text{Cl} \\ \text{O} \end{smallmatrix} \right. = \text{bismuthic oxychloride}$ , while  $\text{Hg}_4 \left\{ \begin{smallmatrix} \text{Cl}_2 \\ \text{O}_2 \\ \text{N}_2 \end{smallmatrix} \right. = \text{tetramercuro-tetrahydric dioxi-$

dichloro-dinitride. The nomenclature of organic compounds is founded on the same principles as that of inorganic bodies; but our limited space prevents our entering into this subject.

*Chemical notation* has been considerably altered by certain members of the recent chemical school; but on the whole, the modifications, since the time when the system of Berzelius was introduced into England in the third edition of Turner's *Elements of Chemistry*, are not numerous. The most important are the introduction of "general formulæ" by Gerhardt, in which letters of variable value are used as coefficients instead of numbers, and Odling's method of denoting the atomicity of polyatomic elements and radicals by means of accents placed above the symbols, which are then called dashed symbols. See TRIADS. Chemists are still at variance as to whether, when two or more atoms are represented in a compound, the figure indicating the repetition should be above or below the symbol; whether, for example, water should be represented by  $\text{H}^2\text{O}$  or  $\text{H}_2\text{O}$ , and alcohol by  $\text{C}^2\text{H}^2\text{O}$  or  $\text{C}_2\text{H}_2\text{O}$ . The *ordinary* or *dualistic* system, according to which the elements combine in couples to form compounds, which similarly unite by twos, led to the division of salts into two classes—viz., into salts composed of an oxygen acid and an oxygen base, which were hence called oxygen salts, as  $\text{NaO}, \text{SO}_2$ , and  $\text{KO}, \text{NO}_2$ , which in the old notation represent sulphate of soda and nitrate of potash; and binary or haloid salts, of which chloride of sodium,  $\text{NaCl}$ , is the type, which are formed by the union of the radical in hydrogen acids with some metal. Davy considered that the former class might be made similar to the latter by regarding them as composed of a metal and a compound radical having the same electro-negative chemical relations as the radicals in the hydrogen acids. According to this view, a radical,  $\text{SO}_2$ , not yet isolated, combines with hydrogen to form sulphuric acid, and with a metal to form sulphates, sulphuric acid being represented by  $\text{H}, \text{SO}_2$ , and sulphate of lime by  $\text{Ca}, \text{SO}_2$ . In like manner, nitric acid and the nitrates were supposed to contain a radical,  $\text{NO}_2$ . Against this view Gerhardt urges that we know nothing of the proximate constitution, but are merely acquainted with the ultimate composition of compounds. Hence we now no longer use a formula for sulphuric acid indicating its supposed constitution ( $\text{HO}, \text{SO}_2$ ), but regarding it as a dibasic acid, express it, either as Miller does,

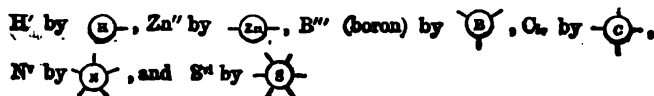
by  $\text{H}_2, \text{SO}_2$ , or by  $\text{H}_2, \text{SO}_4$  (where S = 32 and O = 16), or by  $\text{H}_2 \left\{ \begin{smallmatrix} \text{SO}_2 \\ \text{O}_2 \end{smallmatrix} \right. \text{O}_2$ , if we adopt the type-notation; and we must not omit that Frankland, who may be regarded as the leading representative of the English school of modern chemistry, represents it by the formula  $\text{SO}_2, \text{Ho}_2$ , when Ho is the abbreviated formula for HO, and represents a compound radical, to which he gives the name of hydroxyl, and which is commonly known as binoxide of hydrogen, being expressed, according to the old system, by  $\text{HO}_2$ . The following examples may enable the reader to pass from one system to another:

	Old System.	Barred System.	New Atomic Weights.	Frankland's Notation.
Sulphate of potassium.....	$\text{K}_2\text{O}, \text{SO}_2$	$\text{K}_2\text{SO}_2$	$\text{K}_2\text{SO}_4$	$\text{SO}_2, \text{Ko}_2$
Sulphate of zinc.....	$\text{ZnO}, \text{SO}_2, 7\text{HO}$	$\text{ZnSO}_2, 7\text{H}_2\text{O}$	$\text{ZnSO}_4, 7\text{H}_2\text{O}$	$\text{SO}_2, \text{Ho}_2, \text{Zno}^{\cdot}, 6\text{OH}$
Nitric acid.....	$\text{HO}, \text{NO}_2$	$\text{HNO}_2$	$\text{HNO}_3$	$\text{NO}_2, \text{Ho}$
Nitrate of sodium.....	$\text{NaO}, \text{NO}_2$	$\text{NaNO}_2$	$\text{NaNO}_3$	$\text{NO}_2, \text{Nao}$

The Ko, Zno<sup>·</sup>, and Nao in Frankland's notation represent compound radicals, to which he has given the names potassoxyl, zincoxyl, and sodoxyl, and which are represented in the ordinary new notation by KO, ZnO<sub>2</sub>, and NaO. These new names will probably soon get into general use in consequence of Frankland's great influence as the teacher of chemistry in the government school of mines, and at the royal institution.\*

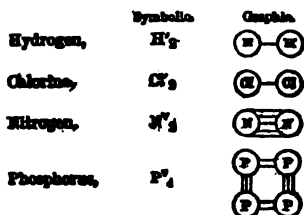
\* Another peculiarity of Frankland's notation is the introduction of thick letters (Egyptian capitals). His formulæ are so written as to denote that the element represented by the first symbol of a formula, and printed in this type, is directly united by points of attachment or bonds with the other elements or compound radicals following the first symbol. Thus, to use his own illustration and notation, the formula  $\text{SO}_2, \text{Ho}_2$  (sulphuric acid) signifies that the hexad atom of sulphur is combined with the four bonds of the two atoms of oxygen, and also with the two bonds of the two atoms of hydroxyl. (By hexad we mean an atom with six bonds, one of which is subsequently figured in the text.)

We must refer to the article TRIADS for a description of what is meant by *atomicity*, or, as Hofmann terms it, *quantivalence*, and the reader will do well to study lectures 10 and 11 of his *Modern Chemistry*. In the article just mentioned, we have stated that the degree of atomicity of an element is indicated by the number of dashes with which it is furnished. In the so-called *graphic notation*, which, in the hands of Kekulé, Crum Brown, Naquet Frankland, and others, has proved a most valuable aid in explanation of the constitution of chemical compounds, the degree of atomicity of an atom is thus expressed :

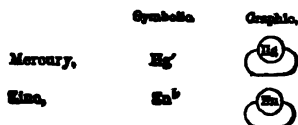


The true meaning of atomicity or chemical valency has up to the present evaded all attempts to solve it by chemical demonstration, and as this property of matter is the link joining its physical and its chemical structure, the theory of chemistry is founded on hypothesis. The theory of valency which most fully complies with the known reactions and properties of matter is based upon the electrical behavior of its atoms. When an electric current is passed through several cells containing different electrolytes, it liberates in each of them the same number of valencies, not of atoms. Helmholtz showed that the quantity of electricity moving with each of the atoms is distributed among its valencies. Reicke from farther researches concluded that the atoms are surrounded by systems of positive and negative poles. The atom is here represented as a sphere surrounded by an envelope of ether in which the valencies are contained, the latter appearing to be determined by the presence of two opposite electric poles at the ends of a short straight line called a di-pole. In a radial position the di-pole forms an axis of rotation of the atom, but in a tangential position the rotation is annulled. This shows two kinds of simple linking. In manifold linking the rotation cannot exist. An understanding of the most important properties of chemical valency may be gathered from this hypothesis.

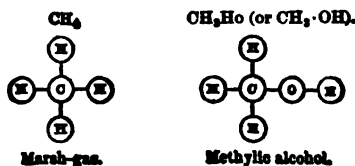
"No element," says Frankland, "either alone or in combination, can exist with any of its bonds disconnected; hence the molecules of all elements with an odd number of bonds are generally diatomic, and always polyatomic—i.e., they contain two or more atoms of the element united together. Thus:



An element with an even number of bonds can exist as a monatomic molecule, its own bonds satisfying each other. Thus:



This graphic notation is most useful in fixing upon the mind the true meaning of symbolic formulæ, and in elucidating the internal arrangement of the very complex molecules which often occur in both mineral and organic compounds. It also affords an easy means of showing the causes of isomerism in organic bodies. The following example will suffice to illustrate our meaning. The simplest of the alcohol family, methyl alcohol, is derived from marsh-gas by the substitution of one atom of Frankland's hydroxyl, Ho or HO (O = 16), for one of hydrogen.



The classification of organic compounds has, during the last few years, been much improved. Until a comparatively few years ago, organic compounds were arranged, according to their most obvious properties, into acids, bases, fatty bodies, etc. Now the great majority of these compounds are arranged in series, of which each group differs from the preceding one by a fixed additional number of certain atoms. Thus (see Armstrong's *Organic Chemistry*, pp. 143, 144) twelve alcohols are represented by the general formula  $C_nH_{2n+1}O$  (new notation), the first being represented by  $CH_3O$ , and the others differing from it by an additional number of multiples of  $CH_2$ . Bodies of analogous properties thus united are termed *homologous*. Again, every compound in a homologous series yields other compounds differing in composition from that from which they are derived, but yet bearing a different relation to it. Thus, alcohol yields ether, aldehyde, and acetic acid, and these so-called *heterologous* bodies form collateral series. This mode of classification is daily extending. It includes the *organic radicals*, such as methyl, ethyl, allyl, phenyl, cyanogen, etc.; the *hydrides of the compound radicals*, such as methylic hydride or marsh-gas, benzol, cyanic hydride or hydrocyanic acid, etc.; the *alcohols*, which form one of the most important of the families of organic compounds, and which are considered in a special article in this CYCLOPEDIA; the *aldehydes* and *ethers*, both of which are specially described; the *acids*, of which the monobasic acids alone include six series, amongst which are the acetic or fatty series, represented by the general formula  $C_nH_{2n}O_2$ , and containing over 20 distinct acids, the oleic series, the lactic series, the benzoic or aromatic series, etc.—while the dibasic acids may be divided into four series, in which occur the succinic series, containing nine acids, most of which present several modifications, and the tartaric series; the *anhydrides* (q.v.), of which those belonging to the acetic acid group may be arranged in series; the *ketones* or *acelones*; the compounds of nitrogen containing the *amines*, *amides*, *imides*, etc.; and, in short, excepting the natural alkaloids, the protein-compounds and their derivatives, the uric acid group, pigments, etc., there are few organic compounds which will not soon find a definite place in a series.

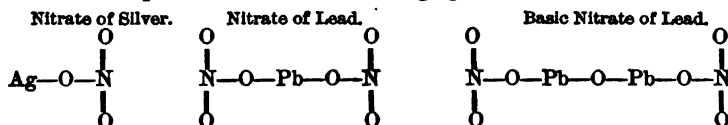
In this article we have strictly confined our remarks to the subjects bearing on general, and for the most part on theoretical chemistry. We may, however, allude, in conclusion, to two subjects, which have undergone a great development during the last few years—viz., *volumetric analysis* and the *synthesis of organic bodies*, both of which are discussed in special articles.

The general tenor of this article shows that chemistry is at present in altogether a transitional state. As Prof. Anderson of Glasgow observes in his address to the chemical section of the British Association in Sept., 1867, the atomic theory, which, at the commencement of the present century, sufficed to explain all the facts of chemistry that were then known, is now quite inadequate to that end. At that time, chemists were acquainted with comparatively few compounds, and in these, oxygen was of such preponderating importance, that the science might have been almost termed "the chemistry of oxygen." Oxygen is now deposed from its high place, and is supplanted by carbon to such a degree, that one of the first living chemists has actually proposed for organic chemistry the name of "the science of the carbon compounds." Facts gradually accumulated in the course of time which did not admit of explanation on the Daltonian theory; and as their number increased, such terms as catalysis, allotropy, etc., were invented, under which such facts were grouped together as were supposed to depend on similar causes. Such grouping may have certain temporary advantages, provided it is understood that, to use Prof. Anderson's words, it is "the grouping of ignorance."

It is indeed obvious that a true theory of chemistry must be a part of a general theory of dynamics, and that until we obtain some more distinct idea of how the atoms are grouped in the molecules of substances (see ATOMIC THEORY) than we at present possess, the link connecting theoretical chemistry and theoretical dynamics is wanting. The doctrine of *atomicity* evidently points to some general truth; it has been of great use in grouping together numerous facts, and in leading to investigations which have resulted in the discovery of many new facts and new generalizations, but we now want an explanation of this doctrine, and this chemistry does not appear to be able to give us. The want of a theoretical explanation does not, however, render a generalization valueless, and much progress has been made of late years in ascertaining the "chemical structure" of substances—that is, in obtaining graphic formulæ, which consistently represent all the reactions by which the substances are formed or transformed. Before discussing the subject of chemical structure, it will be well to consider somewhat more fully than has been done above, the reasons why certain numbers have been selected for the atomic weights of the elements rather than any multiples or submultiples of them (see ATOMIC WEIGHTS). It was pointed out by Dulong and Petit that a close relation exists between the specific heat of a solid elementary substance and its atomic weight. Thus, if we take the old system of *atomic weights* (q.v.), and multiply the specific heat of each solid element by its atomic weight, we find that the elements form three groups. In the first, the product of specific heat into atomic weight, or *atomic heat*, varies from 6 to 6.6. In the second it varies from 8 to 8.3. In the third group, containing the allied elements, carbon, boron, and silicon, no regularity can be traced. By far the greater number of solid elements belong to the first or second group. Now it is plain that the atomic heat of a member of the first group is approximately double that of a member of the second

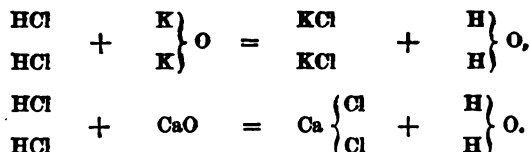
group. But as the atomic weights are to a certain extent arbitrary, we can make the atomic heats of the two groups agree by doubling the atomic weights of the members of the second group. This was first proposed by the eminent Italian chemist, Cannizzaro, and has now been accepted by most chemists. These new atomic weights not only greatly simplify Dulong and Petit's law, but are also in harmony with many other facts, most of which were observed after the change had been made. Thus the formulæ of corrosive sublimate, bichloride of tin, and zinc methyl are, according to the old system,  $\text{HgCl}_2$ ;  $\text{SnCl}_2$ ; and  $\text{ZnCH}_3$ ; and  $\text{H} = 1$ . According to the new system, they are  $\text{HgCl}_2$ ;  $\text{SnCl}_4$ ; and  $\text{Zn}(\text{CH}_3)_2$ .

It will be at once observed that the second set of formulæ represent just twice the quantity represented by the first; now the second formulæ express the *molecular weights* of the substances according to Avogadro's law (see *ATOMIC THEORY*). Further, if we adopt the old atomic weights, we see no reason why oxide of lead should readily form basic salts, while oxide of silver does not. This peculiarity is to some extent explained by the new atomic weights; thus we have nitrate of silver—old formula  $\text{AgNO}_3$ , new formula  $\text{AgNO}_2$ ; nitrate of lead—old formula  $\text{PbNO}_3$ , new formula  $\text{Pb}(\text{NO}_2)_2$ ; basic nitrate of lead—old formula  $\text{PbO.PbNO}_3$ , new formula  $\text{Pb}_2\text{O}(\text{NO}_2)_2$ . The contrast will be better seen if we put the new formulæ into a graphic form.



We at once see the connection between the dyad character of lead ( $-\text{Pb}-$ ), and the occurrence of basic salts.

Similarly let us notice the effect of treating potassium oxide and calcium oxide with equal quantities of hydrochloric acid. The result in one case is two molecules of potassium chloride and one molecule of water; while in the other, it is one molecule of calcium chloride and one molecule of water. Putting the symbols in graphic form we have:



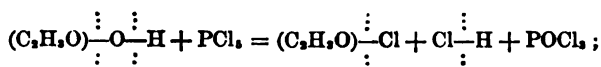
Where we see why we have, in the first case, two molecules of potassium chloride, and in the second, one molecule of calcium chloride, the reason being that calcium is a dyad, and one atom of it has the combining capacity of two atoms of potassium. Many other examples might be given, but these may suffice as an indication of the reasons which have induced chemists to prefer the atomic weights given in the second column in the table in the article *ATOMIC WEIGHTS*.

Assuming, then, these atomic weights, let us return to the subject of *Chemical Structure*. This may be defined in various ways, but most conveniently as the indication by a graphic formula, or something equivalent to it, of all the chemical changes by which the substance can be formed or decomposed. This will best be illustrated by means of a few examples, and we shall select these from among organic compounds, that is, compounds of carbon, because the structure of these compounds has been most fully investigated.

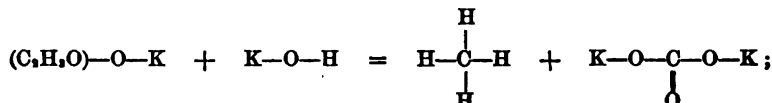
Acetic acid has (on the new system, which will be exclusively used in the remainder of this article) the formula  $\text{C}_2\text{H}_4\text{O}_2$ . If it is treated with caustic potash, it yields acetate of potash according to the equation  $\text{C}_2\text{H}_4\text{O}_2 + \text{KHO} = \text{C}_2\text{H}_3\text{KO}_2 + \text{H}_2\text{O}$ . Here one atom of hydrogen has been replaced by one atom of potassium, and we find that further treatment with caustic potash does not cause any further replacement of hydrogen by potassium. We may therefore write the formula of acetic acid thus:  $\text{H}(\text{C}_2\text{H}_3\text{O}_2)$ , and this formula indicates the replaceability of one atom of hydrogen by metal, and explains (as far as such formulæ can explain anything) the occurrence of such compounds as acetate of lead  $(\text{C}_2\text{H}_3\text{O}_2)_2\text{Pb}$ , and all the other acetates. The question now remains, what is the structure of the group  $\text{C}_2\text{H}_3\text{O}_2$ , which is united in acetic acid to hydrogen, and in the acetates to metal?

To answer it we must examine some other reactions of acetic acid. When treated with pentachloride of phosphorus, it loses an atom of oxygen, the place of which is taken by two atoms of chlorine—the pentachloride of phosphorus taking the oxygen in exchange for the chlorine; but instead of obtaining a compound  $(\text{C}_2\text{H}_3\text{OCl})_2$ , we find that the result is expressed by the equation:  $\text{C}_2\text{H}_4\text{O}_2 + \text{PCl}_5 = \text{C}_2\text{H}_3\text{OCl} + \text{HCl} + \text{POCl}_3$ . We thence conclude that in acetic acid the atom of dyad oxygen removed in the action

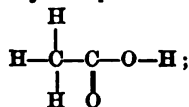
given above was united to an atom of hydrogen, and to the group  $C_2H_3O$ , and represent the change thus:



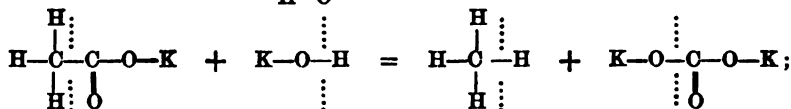
the replacement of the dyad oxygen by two atoms of the monad chlorine necessitating the falling asunder of the compound. The reactions of chloride of acetyl ( $C_2H_3OCl$ ) lead us to the further conclusion that the atom of hydrogen replaceable by metal is the atom not present in chloride of acetyl, so that the formula  $(C_2H_3O)-O-H$  is a fuller and more explanatory form of  $(C_2H_3O_2)-H$ . Again, if we heat acetate of potash with caustic potash, we have marsh gas ( $CH_4$ ) given off, and the residue consists of carbonate of potash.



and this decomposition can only be represented if we give acetic acid the formula



when we have

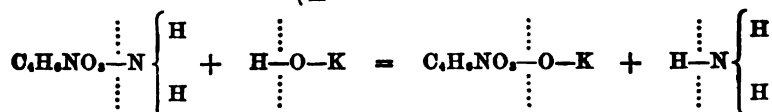


the dotted lines separating in the diagram the symbols of the parts of the molecules which change places.

We have considered only a few of the reactions of acetic acid, but the formula just given is equally consistent with all the others. It is therefore said to exhibit the *structure* of acetic acid. This word "structure" is perhaps a little misleading—we must recollect the precise sense in which it is used, as a concise representation of many reactions. It is conceivable that it may have some relation to the actual relative position of the atoms in a molecule of acetic acid, but we have not as yet any means of ascertaining whether this is so or not.

We may illustrate the meaning of chemical structure further by a somewhat more complex case. Asparagine, a colorless crystalline substance extracted from asparagus, and also from the blanched shoots of other plants, has the composition expressed by the formula  $C_4H_7N_2O_3$ . When treated with caustic potash it yields ammonia and a body called aspartate of potash—the potash salt of aspartic acid. The change is obviously

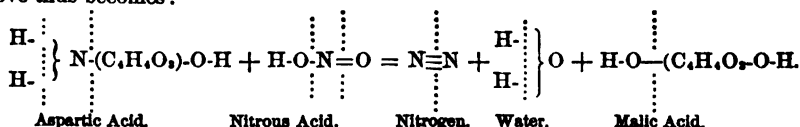
an exchange of  $K-O-$  and  $-N \begin{Bmatrix} H \\ H \end{Bmatrix}$  and may be thus indicated:



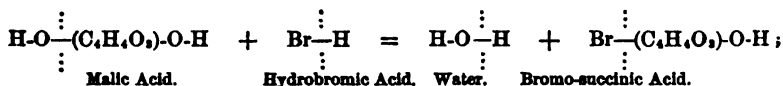
Aspartic acid is then  $(C_4H_7NO_3)-O-H$ , and we have to study its decompositions in order to discover the structure of the group  $(C_4H_7NO_3)$ . Now, aspartic acid is attacked by nitrous acid, and the products are nitrogen gas, water, and malic acid, thus:  $C_4H_7NO_3 + HNO_2 = C_4H_7O_3 + N_2 + H_2O$ . Here we have the triad nitrogen of the aspartic acid replaced by the dyad O, and the monad group  $-O-H$  of the nitrous acid,

and this leads to the formula  $\begin{Bmatrix} H \\ H \end{Bmatrix} N(C_4H_7O_3)-O-H$  for aspartic acid. The equation

above thus becomes:

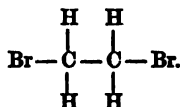


When malic acid is treated with hydrobromic acid, we obtain water and bromo-succinic acid:

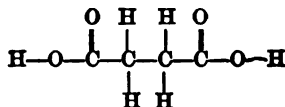
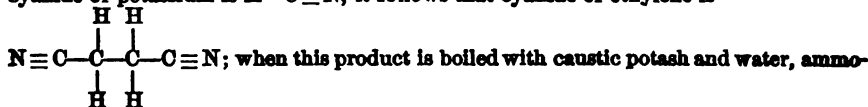


and we can prove that the group  $\text{H}-\text{O}-$ , here replaced by Br, is that one which in aspartic acid is represented by  $\text{H} \left\{ \begin{array}{c} \text{H} \\ \text{H} \end{array} \right\} \text{N}-$ . Bromo-succinic acid, when treated with nascent hydrogen, has its bromine removed and hydrogen put in its place, thus yielding succinic acid ( $\text{C}_4\text{H}_6\text{O}_4$ ). We shall most easily arrive at the structure of succinic acid by studying its synthesis.

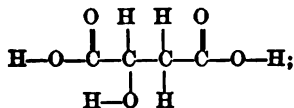
Olefant gas ( $\text{C}_2\text{H}_2$ ) unites with bromine to form a liquid having the composition ( $\text{C}_2\text{H}_4\text{Br}_2$ ), and (as can easily be proved by its relation to glycol and glycollic acid), a structure represented thus:



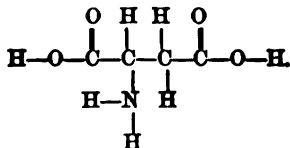
This bromide of ethylene, as it is called, when treated with cyanide of potassium, gives bromide of potassium, and a substance which may be called cyanide of ethylene—bromine and cyanogen changing places ( $\text{C}_2\text{H}_4\text{Br}_2 + 2\text{KCN} = \text{C}_2\text{H}_4(\text{CN})_2 + 2\text{KBr}$ ). As cyanide of potassium is  $\text{K}-\text{C}\equiv\text{N}$ , it follows that cyanide of ethylene is



Here are obviously two hydrogen atoms having a different function from the rest—those, namely, which are replaceable by metal, and which, in the above formula, are represented as directly united to oxygen. That it is not one of these that is replaced by bromine follows from the fact that bromo-succinic acid has also two atoms of hydrogen replaceable by metals in exactly the same way as in succinic acid itself, and as the other four atoms of hydrogen do not differ in position in the diagram from one another, we have only one possible formula for bromo-succinic acid; and therefore, for malic acid:



and for aspartic acid:



We have, however, two possible structural formulæ for asparagine, as it is plain that the two groups  $\text{H}-\text{O}-$  in aspartic acid are not similar to one another, and we have not as yet any means of deciding between them. The reader will see that they are different, and from the way in which structure has been proved, will also see that reactions may be obtained which would decide between the two.

It is not necessary to give any further examples of chemical structure—the two we have treated in some detail may suffice to show how the principle is applied, and what is the nature of the evidence in favor of particular structural formulæ.

Great advances have been made in the science of chemistry by the discoveries of new methods of research, among which the spectroscope has been perhaps the most important. The extreme delicacy of this method of analysis is shown by the fact that the presence of particular elements can be detected with certainty, even in quantities



of less than a millionth of a grain; an amount impossible to detect by ordinary analytical methods. The value of spectrum analysis has been shown also by the detection of several new elementary bodies by its use, and from the fact that in a compound substance it is easy to detect the presence of each ingredient. Discoveries in regard to the nature of solutions have shown that the same vapor pressure, the same freezing point, and the same osmotic pressure are common to solutions of different substances in the same liquid, which contain in the same volume an equal number of molecules of the dissolved substance. This offers the possibility of determining the true molecular weight of substances by experimenting with them in solution instead of, as formerly, only in the gaseous state. Another condition under which attempts have been made to examine substances is near the zero of temperature. This zero is defined as that temperature at which gas molecules exert no pressure, and is fixed by certain reasons at  $-274^{\circ}\text{C}$ . Some highly interesting experiments in this direction have been made by Professor Dewar in the physical laboratory of the Royal Institution of Great Britain. The possibility of converting a gas into the liquid state depends upon cooling it below its critical temperature, above which no pressure can force it into a liquid condition. Hydrogen has a critical point of about  $-240^{\circ}$  and nitrogen about  $-200^{\circ}$ . By using a mixture of hydrogen and ten per cent. of nitrogen Professor Dewar has succeeded in obtaining the lowest temperatures ever reached in laboratory experiments, and has obtained an undetermined liquid not improbably liquid hydrogen. By means of the expansion of liquid air the properties of bodies may be studied at very low temperatures. It was found that the tensile strength of iron at  $-400^{\circ}\text{F}$ . was double what it is at  $80^{\circ}\text{F}$ . above zero. Faraday predicted that the magnetism of a permanent magnet would be increased at low temperatures, and Dewar has verified this by showing that at the temperatures made possible by the use of liquid air the magnetism of a permanent magnet was increased about 50 per cent. It was also shown that the colors of bodies are considerably changed at low temperatures, returning gradually to their original colors as the temperature rises. The attainment of the absolute zero seems to be an impossibility in laboratory experiments, but the study of matter at the abnormally low temperatures thus produced offer a means of verifying conclusions drawn from other methods of research.

Lord Rayleigh and Professor Ramsay announced last year the discovery of a new element in the atmosphere. They were led to such an investigation from observing that the density of nitrogen appeared to vary considerably under different circumstances. By passing an electric spark through air with an excess of oxygen the density of the nitrogen increased to 19.8. Nitrogen was also passed through tubes containing heated magnesium, converting the nitrogen into a nitride, and a residual gas of a density of about 20.8 remained. This was characterized by extreme inertness, and on examination by Professor Crookes its spectrum was found to differ from any other known element. Professor Dewar, in liquefying air, has also observed that a white solid remains after all traces of impurities have been removed from the air, which may possibly coincide with the inert gas found by Lord Rayleigh. There is considerable doubt, however, as to the elementary character of this gas, as well as to the amount in which it exists in the atmosphere. Lord Rayleigh found it in the proportion of about 1 per cent, while the substance noticed by Dewar formed a smaller percentage.

Until the nature of this gas is determined by farther research, there are some reasons for doubt as to its being an element rather than an allotropic form of nitrogen. Considered as the latter, the experimental results obtained can be easily explained. The theoretical density of allotropic nitrogen would be 21, which is very near the value found from the experiments. The inertness of the new gas would be inferred as a characteristic of allotropic nitrogen from analogy to the allotropic form of phosphorus, its nearest allied element. Phosphorus, when heated for some hours at  $240^{\circ}\text{C}$ . in an atmosphere which does not act upon it chemically, is reduced to an allotropic form of a red color, which is compared to yellow phosphorus relatively inert. Nitrogen, being so inert in its common form, would therefore by analogy be extremely inert in its condensed form. If the new gas proves to be a triatomic form of nitrogen, the extent, if any, of its normal presence in air remains to be shown, as this substance may be manufactured rather than separated during the experiment of analysis. Its appearance in such minute quantities favors this view, as if it is produced by electric discharges, its inertness would tend to its accumulation in large amounts. Assuming this new gas to be in reality an element, the name *Argon* (Gr. *ἀργον*, "inert") has been given to it. Its symbol is  $\text{A}$ .

**CHEMISTS AND DRUGGISTS, LAWS RELATING TO.** In the United States the terms apothecaries, druggists, pharmacists, and sometimes chemists, are used with little or no distinction as names of those licensed to compound and sell drugs and medicines upon prescriptions of physicians or otherwise; in Great Britain, however, a legal distinction exists between the three classes—apothecaries, chemists and druggists, and pharmaceutical chemists; the law of 1868, designed specially to restrict the sale of poisons, made the classification just referred to for the sake of public convenience. Under this law apothecaries form practically a lower branch of the medical profession, having the right to practice in certain classes of cases; chemists and druggists are those who have passed an examination at the Pharmacy college and have received a license to sell and compound drugs and poisons; pharmaceutical chemists are those who have passed a second "major"—as it is called—examination, and who constitute a higher branch of the profession. Laws relating to the business of selling and compounding drugs and medicines, under whatever name the

business is carried on and whether in the United States or in England, are either limiting and defining the qualifications of those who may carry on the business, or restricting the sale of poisons or intoxicating liquors, or defining the liability for injuries caused by carelessness or ignorance. Generally speaking, the statutes of the states in this country require a person wishing to adopt the profession of druggist, either to pass an examination before a board appointed for that purpose or to produce a diploma from a college of pharmacy recognized as having authority and weight. Either state or city ordinances prescribe the conditions under which poisons may be sold, directing, for instance, that certain kinds of labels be used on bottles containing the poisons and that the names of persons purchasing be entered in a book open for public inspection. Druggists are sometimes also forbidden to sell certain drugs or liquors except on physicians' certificates. Gross carelessness on the part of a druggist in compounding a prescription, if it leads to death or serious injury, is a penal offense; if death ensue, the offense usually amounts to manslaughter.

**CHEMITYPE** is the name given by its inventor, C. Pül, a Dane, to the art of producing on a metal plate, by a chemical process, an engraving in relief. The outline of the process is this: On a polished plate of zinc an etching or an engraving is made in the usual way. The depressions of this design are then filled up with a melted metal—the nature of which is not revealed—and this superadded metal is then reduced to the exact level of the zinc, so that the design now appears as if inlaid. An acid is next applied to the surface, which attacks the zinc, without affecting the inlaid metal; and thus there results an exact copy in relief of the original intaglio engraving. In competition with wood-cuts, relief-lithographs, and copperplates, C. does not seem as yet to evince any great superiority; it fails especially in that character of strength and softness which wood-cuts express so well. The prints produced by this art look more like engravings than like wood-cuts. They have this advantage, however, that they give an exact copy of the original design made by the artists on the metal; whereas in wood-cutting the drawing made on the block may be impaired in its effect by the engraver. C. is particularly adapted for producing maps by the common printing-press. Pül practiced his invention at first on a small scale in Copenhagen, from 1843 to 1846, and then extensively in Leipsic. In 1860, he went to Vienna, where he was employed in the imperial printing establishment.

**CHEMNITZ**, a t. of Saxony, is situated at the base of the Erzgebirge, and at the confluence of the river Chemnitz with three other rivers, in lat. 50° 50' n., and long. 17° 55' east. It is the principal manufacturing town of Saxony—its industry consisting in weaving cottons, woollens, and silks, and in printing calicoes, chiefly for German consumption. Cotton stockings are a most extensive manufacture, and rival the British in quality and cheapness. They are exported extensively to the United States. It has several extensive machine factories, producing machinery for flax and wool spinning, weaving, and mining industry. Amongst the numerous educational institutes of C. are schools of weaving, mining, and tailoring. For four centuries C. was a free imperial city. Traces of its antiquity are seen in many of the buildings. Pop. '96, 160,991.

**CHEMNITZ, MARTIN**, next to Luther and Melancthon the most distinguished German Protestant theologian of the 16th c., was b. at Treuenbrietzen, in Brandenburg, 9th Nov., 1523; studied at Frankfort and Wittenberg; and, in 1548, became rector of the cathedral-school of Königsberg. About 1550, he began to devote himself seriously to theology, and in 1553 went back to Wittenberg, where he delivered prelections on Melancthon's *Loci Communes*, from which sprang his own *Loci Theologici*, which, for method and learning, excels all similar books of the same age. In 1554, he was made a preacher in Brunswick, where he wrote his *Repetitio Sanæ Doctrinæ de Vera Presentia Corporis et Sanguinis Domini in Cæna Sacra* (Leip. 1561), in which he defended Luther's view of the Lord's Supper against that of the Swiss reformers; the *Theologia Jesuitarum Præcipua Capita* (Leip. 1562); and the *Examen Concilii Tridentini* (Leip. 1565), a work in which he has argued with remarkable acuteness and learning against the dogmas of the church of Rome. His *Corpus Doctrinæ Prutenicæ* (1566), written in conjunction with Mörlin, became a standard work of divinity among the Prussian Protestants. But his greatest ecclesiastical achievement was inducing the Saxon and Swabian churches to adopt as their confession of faith the *Concordienformel*, and thus extending and consolidating the creed of Luther. He died at Brunswick, 8th April, 1586.

**CHEMNITZIA**, a genus of gasteropodous mollusca. It has a slender, elongated, many-whorled shell; the whorls striated; a simple semi-oval aperture; and a horny operculum. There are many recent species scattered all over the world. The discriminating characters of the fossil species being taken from the form of the shell, it is more than probable that the remains of very different animals are classed under this generic name. No less than 180 species have been described, occurring throughout all the divisions of the fossiliferous strata from the lower Silurian upwards.

**CHEMOSH**, the national deity of the Moabites and the Amorites. Solomon introduced the worship of C. into Jerusalem, but Josiah put a stop to it. Scholars are not agreed as to descriptions either of the deity or the worship. Jerome identifies C. with Baal-Peor; others with Baal-Zebub; Genesius with Mars, or some god of war; some

with Saturn, as the star of ill-omen; C. having, according to Jewish legend, been worshiped in the form of a black stone; and Maimonides says his worshipers went bare-headed, and used no garments sewn by the needle.

**CHEMUNG** a co. in s. New York, on the Pennsylvania border, and traversed by the Erie, the Lehigh Valley, the Delaware, Lackawanna, and Western, and the Northern Central railroads. The area is 436 square miles; the population, '90, 48,265. The surface is partly level and partly hilly; soil fertile. The chief productions are wheat, corn, oats, buckwheat, potatoes, hay, butter, wool, honey, and tobacco. There are in the county several carriage and wagon manufactories, flour-mills, saw-mills, tanneries, etc. Co. seat, Elmira.

**CHEMUNG PERIOD** is the name given by American geologists to one of the principal divisions of Devonian (q. v.) time.

**CHENAB**, the largest, according to general opinion, of the five rivers which give name to the Punjab.

**CHENAN'GO**, a co. in s. New York, on a branch of the Susquehanna and the Chenango and Unadilla rivers, and the New York, Ontario, and Western, and the Delaware, Lackawanna and Western railroads; 864 sq. m.; pop. '90, 37,776. It has an elevated, hilly, and broken surface, with fruitful soil, producing corn, wheat, oats, potatoes, hay, cheese, butter, wool, maple sugar, and hops. There are in the county more than 40 cheese factories, and several flour mills, tanneries, furniture, and carriage manufactories. Co. seat, Norwich.

**CHENAN'GO RIVER**, a stream in central New York, rising in Oneida co., and flowing with a length of about 90 m., through Madison and Chenango counties to the Susquehanna, near the Pennsylvania boundary.

**CHENERY**, THOMAS, 1820-1884; b. in Barbadoes; educated at Eton and Cambridge; prof. of Arabic at Oxford, 1868-69; was appointed one of the revisers of the Old Testament, 1870; honorary sec. to Royal Asiatic soc. C. was one of the most thorough Arabic scholars in England, and will be remembered chiefly by his translation of *The Assemblies of Al Harui* and his edition of *Machberoth Ithiel*, 1872. He was the successor of Mr. Delane as editor of the *London Times*, 1877.

**CHENEY**, CHARLES EDWARD, D.D.; b. 1836; a graduate of Hobart college, and a student in the Virginia theological seminary (Episcopal). He had pastoral charge in Rochester and Havana, N. Y., and in Chicago, Ill. In Dec., 1873, having left the Protestant Episcopal church, he was chosen assistant bishop, and afterwards bishop, of the Reformed Episcopal church, then newly organized. He is a vigorous thinker and an able organizer; he is still rector of Christ church, Chicago.

**CHENEY**, JOHN VANCE, librarian, b. Groveland, N. Y., 1848; practiced law in New York; became librarian of the public library at San Francisco, 1887, and of the Newberry library at Chicago, 1894; published several poems, including *Thistle Drift* (1887) and *Wood Blooms* (1888).

**CHENEY**, SETH, 1810-1856; b. Conn.; famous as artist of female heads in crayon. To him is attributed the initial movement of crayon work in this country. His wife, Ednah Dow, b. 1824, is a well-known author.

**CHÉNIER**, ANDRÉ-MARIE DE, 1762-94; a French poet, b. in Constantinople. He undertook military life, but resigned his commission after six months' trial, and returned to Paris, where he wrote idyllic poems, such as *Le Mendicant*; *L'Aeugle*; and *Le Jeune Malade*. Overwork made a journey for health necessary, and he traveled in Switzerland, Italy, and the Grecian islands. Returning to Paris in 1786, he recommenced study and work, and produced the *Elegies*; *Art d'Aimer*; *L'Invention*; *Hermes*; *Susanne*, and *La Liberté*. From 1787 to 1790, he resided in London as a secretary to the French embassy, but neither the position nor the people were congenial, and he returned to France, plunging at once into the revolution, then well under way, taking the moderate side. In 1791, he was defeated as a candidate for a seat in the national assembly, and the next year an invective against the Jacobins involved him in a quarrel with his brother Joseph, whom he was afterwards to defend against the attack of Burke. When the hopes of the monarchy were gone, he returned to literature, but the trial of the king brought him once more forward, and he took part in preparing the defense, and also drew up an appeal to the people. He was broken in health and spirits; Paris was dangerous; and he went to Versailles, where he wrote poems to "Fanny." At Passy, Jan. 6, 1794, he opposed the arrest of a lady in whose house he was living, an act which resulted in his own seizure and incarceration in St. Lazare. Here he wrote *La Jeune Captive* for the duchess of Fleury, and for the convention the furious iambs so often quoted. At the tribunal he appeared with 44 others, and 38, including himself, were condemned to execution. The next day, July 25, 1794, he, with the counts de Montalembert and de Crequi, was led to death. As he descended the steps of the conciergerie, he said to Roucher, "Je n'ai rien fait pour la postérité. Pourtant" (striking his forehead), "j'avais quelque chose là." Three days later, in the same place, Robespierre and his fellows were executed, and the "reign of terror" was at an end. C.'s poems, with the exception of two, remained unedited for a quarter of a century.

**CHÉNIER**, MARIE JOSEPH DE, 1764-1811; poet and dramatist, younger brother of André Chénier; b. in Constantinople, and educated at the Collège de Navarre. He also served a short time in the army, but left it for literary composition, producing, at the age

of 20, *Azemire*, a tragedy which was not very successful. His next work, however, *Charles XII.*, gave occasion for the commencement of Talma's renown, and gained great popularity. It still keeps the stage. Following these came *Henry VIII.* and *Calas*; in 1792, *Caius Gracchus*, which was proscribed and burned because of the anti-anarchical phrase "The law, and not blood;" and the drama *Timoleon*, proscribed in 1793. The death of his brother on the scaffold took him away from play-writing, which he attempted again only once (in 1804), when he produced *Cyrus*, which was not a success. He was long a prominent member of the Jacobin club; a member of the convention, and also of the council of five hundred, over both of which he presided; he had a seat in the tribunate, and belonged to the committees of public instruction, of general security, and of public safety. In 1806-7, he delivered a course of lectures, on the language and literature of France from the earliest period; and in 1808, at Napoleon's request, he prepared his *Tableau Historique de l'Etat et du Progres de la Littérature Française*. He was the author of many hymns, songs, and odes, among them the famous *Chant du Départ*; odes on the death of Mirabeau, the oligarchy of Robespierre, etc.; tragedies that never reached the stage, and translations from the Greek, Latin, and German authors. As a satirist he was said to possess great merit.

**CHENILLE** (Fr., "hairy caterpillar"), a thick, velvety, tufted cord of silk, wool, or worsted, having short fibres or threads standing out at right angles from a central core of thread, or wire (and so bearing some resemblance to a woolly caterpillar). It is used in trimming and bordering dresses, in ornamental sewing, and in manufactured trimmings. In certain kinds of carpet chenille is used instead of yarn to form the weft. In embroidery, also, chenille is employed, being either laid on the surface of the stuff or drawn through with a needle. Chenille is used also in combination with wool or cotton in the manufacture of a cloth, known as *chenille cloth*.

**CHENONCEAUX, CASTLE OF.** See BLÉRÉ.

**CHENOPODIA'CEÆ**, or **SALSOLA'CEÆ**, a natural order of exogenous plants, consisting of herbaceous and half-shrubby plants, with leaves entire or divided, and destitute of stipules. The flowers are inconspicuous, hermaphrodite, or unisexual; the perianth deeply divided, persistent; the stamens inserted into its base, opposite to its segments, and equal to them in number, or fewer; the ovary single, free, or occasionally adhering to the tube of the perianth, with a single ovule attached to the base of the cavity; the style generally with 2 to 4 divisions. The fruit is membranous, inclosed in the perianth, which sometimes becomes fleshy. The seed has a curved or spiral embryo.—There are about 860 known species, most of which have a weed-like appearance, and grow in waste places. They are widely diffused over the world, but are particularly abundant in the northern parts of Europe and Asia. Beet and spinage are among the best known and most useful plants of the order. Many are occasionally used as pot-herbs, as some species of *chenopodium* and of orache. The fruit of strawberry blite (*blitum capitatum* and *B. virgatum*), a common weed in the s. of Europe, has some resemblance in appearance to a strawberry, from the coherence of the fleshy perianths of a whole spike or head of flowers, and a sweetish, insipid taste. The seed of quinoa (q. v.) is used for food as a kind of grain. Some of the C. are aromatic (see **CHENOPODIUM**). Some inhabit salt-marshes, and abound in soda, as the saltworts (q. v.).

**CHENOPODIUM**, a genus of plants of the natural order *chenopodiaceæ*, of which some of the native British species are well known by the name of **GOOSEFOOT**, as weeds growing in gardens, on heaps of rubbish, and in waste places. The species are mostly annuals, with entire or toothed leaves, which in some of them have a sort of mealy hoariness. They are mostly natives of Europe, and of the temperate parts of Asia; but some are natives of America, into which, however, some of the common European species have found their way, and are naturalized as weeds. The genus has hermaphrodite flowers, with perianth of five small green scales, five stamens, and solitary flat seeds. The leaves of many species are used as a substitute for spinage, particularly those of the **GOOD HENRY**, **WILD SPINAGE**, or **ENGLISH MERCURY** (*C. bonus Henricus*), a perennial plant, native of Britain and other parts of Europe, often found growing by waysides, with stem more than a foot high, powdered with minute transparent globules, and large, alternate, triangular, arrow-shaped, entire leaves. It is cultivated in some places, particularly in Lincolnshire, chiefly for the leaves, but the young shoots are also used as asparagus. *C. intermedium*, *C. album*, etc., annuals, common in waste places, are also excellent substitutes for spinage. *C. olidum* or *vulgaris* (**STINKING GOOSEFOOT**), an annual with an extremely nauseous odor, growing in waste places in Britain, etc., especially near the sea, is a popular medicine, in much repute as an antispasmodic and emmenagogue. *C. botrys*, a native of the s. of Europe, with pinnatifid leaves resembling those of the oak, and hence called **JERUSALEM OAK**, is in use as an expectorant and anthelmintic. It is not fetid like the species last named, but agreeably fragrant. *C. ambrosioides* has a strong aromatic odor, is used in Mexico instead of tea, and is much cultivated in France, an infusion of it being deemed useful in nervous disorders. *C. anthelminticum*, the **WORMSEED** of the United States, has a strong and somewhat aromatic odor, and a high reputation as a vermifuge. Its seeds are chiefly used, or the essential oil extracted from them, called *oil of wormseed*. More important than any of these species, as affording a principal article of food in the countries of which it is a native, is quinoa (q. v.).

**CHEOPS**, according to Herodotus, an Egyptian king, called Chombes by Diodorus, Soughis by Manetho, Saophis by Eratosthenes, and in Egyptian "Khufu." He was the second king of the fourth dynasty of Manetho, and the builder of the great pyramid at Ghizeh. His name was supposed to mean "wealthy," or "having much hair." He spent enormous sums on the pyramid (see PYRAMID), and one improbable story is that he was compelled through want of money to sacrifice the honor of his daughter to insure its completion. He is also depicted as impious towards the gods, closing the temples, and stopping the worship; but subsequently repenting, and writing a sacred book much esteemed by the Egyptians. The monumental information about C. does not confirm the Greek historians; on the contrary, it records the construction of temples in honor of the gods, the repair of the shrine, and the gift of various figures to the temple of Isis and Athor, close to his own pyramid, and his construction or repair of the temple of the same goddess Athor, the Egyptian Venus, at Denderah, or Tentyris. C. carried on war at the valley Magarah, in the peninsula of Sinai in Arabia; and a rock tablet represents him as having conquered the hostile tribes in the presence of the god Thoth, who had revealed to him the mines of the locality. His oppression had so afflicted Egypt, that charges of impiety had attached to his name; but the tombs of his children reveal no change in the established religion, and his pyramid differs from those of his predecessors and immediate successor only by its larger size and greater beauty. The date of C., according to Lepsius, is 3,095 to 3,032 B.C.; but great difference of opinion, amounting to nearly 2,000 years, exists as to the time of Menes, from whom the lists separate him by an interval of 898 years.

**CHEPHREN**, in the hieroglyphs "Khafra," called also Cephren, Chabrias, Soughis II., and Saophis II.; according to the legends, the son or brother of the Egyptian king Cheops. He built the second of the great pyramids at Ghizeh, near the sphynx and the great pyramid, and was said to have been tyrannical and hated, like his brother, so that his mummy was not buried in the sepulcher, but torn to pieces, and the sarcophagus emptied of its contents; but there is no more reason for believing in his impiety than in that of Cheops. His wife was a priestess of the god Thoth, and another prince of the family was a priest at Hermopolis. He also built the small temple behind the sphynx. It is probable that he lived 95 years, and his reign, according to Lepsius, was 3,032 to 2,966 B.C. A statue of him is in the Boulaq museum.

**CHEPSTOW**, a river-port in the s.e. of Monmouthshire, on the right bank of the Wye, 2½ m. from its junction with the estuary of the Severn, and 14½ m. e.n.e. of Newport. It lies between bold cliffs, on a slope rising from the river, in the midst of beautiful and grand scenery.

**CHEQUE**. See CHECK.

**CHEQUE BANK**, a bank founded in London, in 1873, with the Rt. Hon. John Bright and the late Samuel Morley as trustees. Under a unique and exceptionally safe system devised by a Mr. Herz, it was especially designed to place in the hands of travelers and the public generally, cheques that would be available as ready cash in any part of the world. The procedure is as follows: The customer deposits what money he desires, and receives a book containing cheques to the value of the deposit, each cheque being numbered, printed, and perforated with the value, and is of no worth until the cheque is signed by the customer, who is provided with a special letter of identification, and is required to produce the same on application. See CREDIT, LETTER OF.

**CHER**, a tributary on the left side of the river Loire, rising near Crocq, in the department of Creuse; flows first n. by Auzances, Evaux, Montluc, and St. Amand; then n.w. through the department of C. by Vierzon; then westward by Selles, Mont-richard, and Bléré, to the Loire, which it joins below Tours. Its whole length is about 200 m.; and it is navigable for the last 47 of its course.—**CHER**, the central department of France, to which the above river gives its name, is situated in lat. 46° 25' to 47° 39' n., and in long. 1° 55' to 8° 10' east. The surface is mostly level, traversed by well-wooded elevations, and produces corn, fruits, wine, hemp, flax, etc. The climate is mild and pleasant. Agriculture and pasturage of cattle are both capable of improvement. Area, upwards of 2700 sq. miles. Pop. '96, 347,725. C. is divided into the three arrondissements—Bourges, St. Amand, and Sancerre. Bourges is the chief town.

**CHERASCO**, a t. in the province of Cuneo, n. Italy, situated on the Tanaro, 80 m. s.e. of Turin. It has manufactures of silk, and a pop. of about 9000. A peace was concluded here between Louis XIII. of France, and the duke of Savoy in 1631. On April 26, 1796, the place was taken by the French; and here, three days after, the "Armistice of Cherasco" was concluded between the Sardinian commissioners and Napoleon, by which the latter obtained the right of free passage for his troops through the Sardinian states; and the treaty that followed gave to the French republic Savoy, Nice, and the possessions of Piedmont to the westward of the Alps' highest ridge.

**CHERBOURG**, a fortified seaport t. and arsenal of France in the department of Manche, is situated at the head of a deep bay on the northern extremity of the peninsula of Cotentin, on the English channel, and opposite the w. coast of the isle of Wight, in lat. 49° 40' n., and long. 1° 35' west. Napoleon I. began to build the great defenses of this northern stronghold of France. His nephew, Napoleon III., developed his plans, but not with the original view of an invasion of England. Occupying a

prominent position on the French coast, only some 60 m. removed from the s. shore of England, the harbor-works have been extended, strengthened, fortified, and provisioned with cannon—the dockyards improved, and facilities of embarkation afforded. A description of the stupendous breakwater of C., inclosing a space of nearly 2000 acres, will be found in the article **BREAKWATER**. In connection with its fortifications, this breakwater assumes an importance that attaches to no other work of the kind in existence. At the apex of the angle formed by the meeting of the two branches of the breakwater or *digue*, there is a center fort or battery, measuring 509 ft. on the inner line of the parapet, which forms a flat semi-ellipse. The circular forts at the extremities of the breakwater are remarkably well placed for purposes of defense. Behind the center battery there is an elliptical tower, measuring 225 ft. on the major, and 128 ft. on the minor axis. The entrances to the harbor are round the ends of the mole; and the passages are further defended by the fortifications of the Ile Pélée, and by the batteries of La Roche Chavaignac and fort Querveville. A series of coast redoubts, and the two large fortifications of Les Roches des Flamands and du Homet, are situated behind this outer zone of defense. Besides batteries on the mole, C. is defended by many regular forts and redoubts. The town itself is commanded by La Roule (an exceedingly strong fort) and fort d'Octeville on the heights behind. The military port of C. consists of an outer harbor of 776 ft. in length by 668 ft. wide, its minimum depth being 58 ft., and the entrance to which is 206 ft. wide at its narrowest point. This harbor communicates by means of a lock with a floating basin, 957 ft. long by 712 wide. The outer harbor has four building-slips for 120-gun ships, besides some smaller slips, and a fine graving-dock. In Aug., 1858, an inner floating-harbor was inaugurated by the emperor of the French, in presence of the queen and many of the lords and commons of Great Britain. This harbor, entirely cut out of the solid rock, has a length of about 930 yards, and a breadth of 437 yards, and is surrounded by beautiful building-slips and capacious graving-docks. It is calculated that the roads of C. cannot, on account of the small depth of the greater portion, shelter more than 25 or 30 sail of the line, and about as many frigates, at one time. C. has a safe and commodious commercial port quite distinct from the other, situated on the s.e. Among its industries are ship-building, sugar-refining, lace making, tanning and dyeing. C. is a very ancient place. It is thought by some to be on the site of the old Roman *Coriathum*, and the name was regarded as a corruption of *Cæsar's Burgum* or Cæsar's Borough. In the 11th century the castle is mentioned under the title of *Carusburg*. William the Conqueror constructed some buildings here, and Henry II. several times made it his residence. It was pillaged by an English fleet in 1295 and during the invasion of Normandy in the 14th century it frequently suffered. In the Hundred Years' War it was captured by the English (1418) after a siege of four months, but was regained by Charles VII. in 1450, after which it remained in the hands of the French. Louis XIV. attempted to make it a military fort, but the works were dismantled in 1689. In 1758 the English inflicted severe damages upon the fortifications. The great breakwater described above was begun by Louis XVI. Population, 1896, 40,783.

**CHERBULIEZ**, ANTOINE ÉLISÉE, 1797–1869; a native of Switzerland, professor of political economy in Geneva and in the national polytechnic school in Zurich. He was a contributor to cyclopædias and periodicals, and author of *L'Utilitaire*, and *Precis de la Science Economique*.

**CHERBULIEZ**, VICTOR, b. 1832; a Swiss author, the son of a Latin professor in Geneva. He has written many novels for the *Revue des Deux Mondes* (Paris), among them *Le Comte Kostia*; *Le Prince Vitale*; *Pauls Méré*; *Le Roman d'une honnête Femme*; *L'Idée de Jean Tellerot*; *Samuel Brohl et Cie.*; *Noirs et Rouges* (1890); *La Ferme du Choquard* (1885); *La Vocation du Comte Ghislain* (1888); *The Tutor's Secret* (1893), etc. Under the name of "G. Valbert," he published papers on politics. He became a member of the French Academy, '81.

**CHEERIBON**, or **SHEERIBON**, a seaport t. of Java, situated on the n. coast, 125 m. e.s.e. of Batavia. It has a considerable trade in coffee, indigo, and teak-wood, and is the residence of a Dutch governor. Pop. 52,000.

**CHERIMOYER**, or **CHIRIMOYA**, *Anona cherimolia*, the most esteemed fruit of Brazil and Peru, now common and even naturalized in some parts of the East Indies, and other tropical countries of the old world. It is a fruit of most delicious flavor, is sometimes described as the finest of all fruits, and sometimes as inferior only to the mangosteen. It belongs to the same genus with the custard apple (q.v.). Both flowers and fruit emit a pleasant fragrance, but when the tree is covered with blossom, the odor is so strong as to be almost overpowering. The fruit varies from the size of an orange to 16 lbs. or upwards in weight. It is roundish, or heart-shaped. Externally, it is greenish, covered with small knobs and scales. The skin is rather thick and tough. Internally, the fruit is snow-white and juicy, and contains a number of small brown seeds.

**CHEROKEE**, a co. in n.e. Alabama, on the Georgia border, on the Coosa and Chattooga rivers, reached by the Selma, Rome, and Dalton railroad; 586 sq. m.; pop. '90, 20,459, inclu. colored. The surface is mountainous, and in large part covered with forests of pine and oak. Productions mainly agricultural. Co. seat, Centra.

**CHEROKEE**, a co. in n.w. Georgia, on the Etowah river, which is navigable by steamboats; 400 sq. m.; pop. '90, 15,412, includes colored. It has a rolling surface and fertile soil, yielding the usual agricultural crops. Co. seat, Canton.

**CHEROKEE**, a co. in n.w. Iowa, on Little Sioux and Maple rivers, traversed by the Illinois Central railroad; 576 sq. m.; pop. '90, 15,659. Agriculture is the chief business. Co. seat, Cherokee.

**CHEROKEE**, a co. in s.e. Kansas, bordering on Missouri and the Indian territory; 576 sq. m.; pop. '90, 27,770. It is an agricultural region, and is intersected by the Kansas City, Fort Scott, and Memphis railroad. Co. seat, Columbus.

**CHEROKEE**, a co. in s.w. North Carolina, the extreme point of the state, adjoining Georgia and Tennessee; 530 sq. m.; pop. '90, 9976. It has a mountainous forest-covered surface, and is little cultivated. Co. seat, Murphy.

**CHEROKEE**, a co. in e. Texas, between the Angelina and the Neches rivers, intersected by the International and Great Northern railroad; 1000 sq. m.; pop. '90, 22,975, includ. colored. It is in an excellent agricultural region, consisting of alternating woodland and prairie. Co. seat, Rusk.

**CHEROKEES**, in their own tongue called Tsanaghee, a tribe of Indians of the Indian Territory, U. S. Their original home was in the country now forming portions of Florida, Georgia, Alabama, Mississippi, and Tennessee. They were then in two great divisions, the Ottare, or Otari, dwelling in the mountainous districts, and the Airate, or Erati, occupying the lower lands; and they were further divided into seven clans, each of which prohibited intermarriage between its own members. They adhered to the English in early colonial times, formally recognized the king in 1780, and in 1755 ceded territory and permitted the establishment of English forts. The tribe was considerably advanced in civilization when the war of the revolution began. They clung to the royalist side, and in consequence their country was laid waste by American forces. They were subjugated after a few years of intermittent war, during which they lost much territory, and, by the treaty of Hopewell, Nov. 28, 1785, they acknowledged the sovereignty of the United States, and were confirmed in the possession of their hunting grounds. Then began the ever-recurring story of white man's encroachment and red man's resistance, with the ultimate advantage on the side of the intruders. By treaties in 1791 and 1798, portions of their territory were surrendered, and many of their people emigrated beyond the Mississippi. In 1817, the C. on the Arkansas numbered 3,000. Those who remained in their old territory abandoned hunting, and the greater portion of them lived by agriculture. But the white men of Georgia, who coveted their lands, demanded the removal of the remaining C. notwithstanding the great services which they had rendered (1812-15) in the war with England; and though the Indians were entirely peaceable, generally industrious, and were fast becoming Christianized by the efforts of Moravian missionaries and those of the American board, the clamor for their removal prevailed, and in July, 1817, they were forced to exchange their eastern lands for territory w. of the Mississippi. The end was not effected, however, without much trouble and bloodshed. Georgia passed laws extending over the territory of the C., by which the Indians were practically outlawed, deprived of citizenship, and prohibited from being witnesses. They appealed to the U. S. supreme court, and that body—which long afterward decided that a negro had no rights that a white man was bound to respect—refused the Indians the right to bring an action; and finally the general government confessed its inability to fulfill its own treaty obligations. But this inability did not prevent the federal government (in 1835) from making a treaty with a small portion of the tribe for the removal of the whole of them, and three years later an armed force was sent into their country to compel the removal. At that time the whole number of Indians in their old homes was about 27,000. The Indians were themselves divided; one section, led by John Ross, at first opposed, but at last directed the removal. Within a few years, after much difficulty and not a few murders, their removal was effected. Since their occupation of a share of the Indian territory, the C. have greatly advanced in learning and in material prosperity. About 1821, a member of the tribe invented an alphabet, and books and newspapers have been printed in their own language for half a century. In the late civil war, they at first favored the confederates, but the majority soon came over to the union side. Between the two armies, their territory suffered severely, and they were compelled to emancipate their slaves. The territory of the C. now amounts to about 5,000,000 acres, and they have, in the keeping of the United States, school and orphan funds to the amount of about \$1,600,000. They are governed by a national committee and council elected for two years, and a chief who is chosen for four years. In 1890, the C. numbered 29,599. Their public school system is admirable. They live in well-built villages, and are peaceable and industrious. Tahlequah is their chief town, and contains two colleges and a newspaper office.

**CHEROOT.** See TOBACCO

**CHERRY**, *Cerasus*, a genus or sub-genus of plants, of which the best known yields one of our most esteemed stone-fruits. This is usually regarded as a sub-genus of *prunus* (see PLUM), but is erected by some botanists into a distinct genus on very slender grounds, the most obvious distinction between the species of *cerasus* and the true species

of *prunus* being that, in the former, the young leaves are conduplicate, or folded up, and in the latter they are convolute, or rolled together. Two species are pretty generally regarded as the parents of the garden cherries usually cultivated, *prunus* or *cerasus avium*, and *P. cerasus* or *C. vulgaris*—the former having the underside of the leaves hairy and a small austere fruit; the latter having smooth shining leaves and a more juicy fruit. *C. avium* attains a height of 40 to 50 feet. *C. vulgaris* is a smaller tree. Both have white flowers in clusters or nearly sessile umbels, and both are generally regarded as natives of Britain, and of the middle and s. of Europe. In a wild state, they are usually called *GEAN* (*guigne*), and *C. avium* is frequently planted—not only because it is exceedingly ornamental when in flower, but also as a timber-tree, being of rapid growth, with firm, strong, close-grained wood, suitable for the purposes of cabinet-makers, turners, and musical-instrument makers. But according to some botanists, there is only one species, of which these are varieties; and according to others, *C. vulgaris* is a native of Syria and other parts of western Asia, and is only naturalized in Europe, having been first brought to Italy by Lucullus, after his victory over Mithridates (74 B.C.), from Kerasunt, on the coast of the Black sea, from whence it derives its name. The cultivated varieties of the *C.* are very numerous, and differ very considerably in size, color, and flavor. The fruit of the *C.* supplies the inhabitants of some parts of France with a principal article of food, especially the wood-cutters and charcoal-burners of the forests; and among their modes of preparing it is that of making it a principal ingredient in soups. It ripens in Norway and East Bothnia as far n. as lat. 63°. In some parts of Germany, the public roads are lined for many miles together with avenues of *C.* trees. Besides its use for the dessert and for preserves, the *C.* is extensively used for making liquors. See *KIRSCHWASSER*; *LIQUEUR*. Varieties of *C.* with double flowers, and with pendulous branches, are frequently planted for ornament in shrubberies, and few trees or shrubs are more beautiful. The *all-saints C.* produces flowers almost all summer, and even in autumn. Its fruit is small and rather acid.—The other species of *C.* are numerous. Some species are low, or even prostrate shrubs, as *C.* or *P. chama-cerasus*, the *GROUND C.* of the s. of Europe and of Siberia; and *C.* or *P. pumila*, the *SAND C.* of North America.—The genus or sub-genus *cerasus* contains also the different kinds of bird *C.* (q.v.) and choke *C.* (q.v.), including the American *WILD C.*, famous for its medicinal bark; the *MAHALEB* (*C.* or *P. mahaleb*) of the s. of Europe, and the *CAPOLLIN* (*C.* or *P. capollin*) of Mexico and Peru—the first famous for the fragrance of its flowers, and the second for the fragrance of its fruit; and the *Cherry-laurel* (q.v.).

**CHERRY**, a co. in northern Nebraska; formed 1883; drained by the Niobrara river; 5668 sq.m., pop. '90, 6428. Co. seat, Valentine.

**CHERRY-LAUREL**, or **LAUREL-CHERRY**, a name given to those species of *prunus* or *cerasus* (see **CHERRY**) which have evergreen leaves. They are also often called **LAUREL**. They have small flowers in long racemes, and small fruit; the fruit of a nauseous taste; and most parts of the plant, but particularly the leaves and kernels, remarkably abounding in hydrocyanic (prussic) acid, and therefore very poisonous.—The **COMMON CHERRY-LAUREL**, sometimes called the **BAY-LAUREL** or **LAUREL-BAY**, very often spoken of simply as the **LAUREL** or **COMMON LAUREL** (*prunus* or *cerasus lauro-cerasus*), is a shrub, sometimes of very large size, with ovato-lanceolate, convex, smooth, remotely serrated, shining, yellowish green leaves, and erect racemes of flowers. It is originally from Asia, but is now naturalized throughout the s. of Europe, and is one of the most common ornamental shrubs in Britain, where it suffers only from such severe frosts as are of rare occurrence. It is propagated by seeds, layers, and cuttings. Its leaves resemble bitter almonds in smell and taste, and contain in great abundance the same essential oil (see **ALMONDS**, **VOLATILE OIL OF**), rich in hydrocyanic acid. From these leaves, by maceration in water for 24 hours, and subsequent distillation, is obtained the *laurel-water* (q.v.), or *cherry-laurel water*, sometimes employed in medicine as a substitute for hydrocyanic acid, and which formerly was so much used as a poison. The leaves are sometimes employed also for flavoring puddings, sauces, etc., and are safer for such purposes than oil of bitter almonds, but ought to be used with caution.—Another species, also very common as an ornamental shrub in Britain, but not quite so hardy as the common cherry-laurel, is the **PORTUGAL LAUREL** (*prunus* or *cerasus Lusitanica*), a native of Portugal, a large shrub—sometimes a tree—with dark-green leaves and lateral racemes. It does not grow so well under the shade of trees as the common cherry-laurel.

**CHERRY VALLEY**, a village in Otsego co., N. Y., 68 m. w. of Albany, reached by way of the Delaware and Hudson railroad; pop. of the village, 1890, 886. The village was the scene of a massacre of Americans, Oct. 11, 1778, by Indians and Tories under direction of British officers; 16 soldiers of the revolutionary army and 83 inhabitants, nearly all women and children, were killed, and all others carried into captivity. Every house in the settlement was burned.

**CHERSIPHON**, an architect of Crete, who, with his son Metagenes, built or began to build the great temple of Artemis at Ephesus, commenced about 600 B.C. The columns were erected about 40 years later. It was completed 230 years after its commencement, and a few years afterwards it was destroyed by fire on the night in which Alexander the Great was born. It was called one of the seven wonders of the world.



**CHERSO**, an island of Illyria, belonging to Austria, in the Adriatic, 12 m. s.s.w. of Fiume. A bridge unites it with the adjoining isle of Loosini. It has an area of about 105 sq. m., with a pop., 1890, of 8300. Its surface is generally hilly and rugged, with forests in the north. The chief town is Cherso, at the head of a bay on the w. side. Pop. about 5000.

**CHERSON**. See **KHERSON**.

**CHERSONESUS**, the ancient name of several peninsulas and promontories in Europe, the most important of which are the Crimea (q.v.), *C. Taurica*; Gallipoli (q.v.), *C. Thracia*; and Jutland (q.v.), *C. Cimbrica*.

**CHERT**, or **HORNSTONE**, a variety of quartz, always massive, and having a kind of granular appearance and structure. It is common in the mountain limestone, oolite, and greensand formations; sometimes forms rocks; and often contains petrifications. It passes into common quartz and chalcedony, also into flint and flinty slate. Its colors are gray, white, red, yellow, green, or brown. The name C. is sometimes limited to the finer varieties, and the coarser are called hornstone.—The name C. is very commonly given to the silicious concretions which occur as nodules and layers in limestone rocks, like flints in the chalk. When these materials exist to such an extent as to render the limestone useless for economical purposes, it is said to be "cherty."

**CHERTSEY** (Anglo-Saxon, Ceort's Eye or Island), a t. in the co. of Surrey, on a low strip of land between the right bank of the Thames, here crossed by a stone bridge, and the brook from Virginia water, 20 m. w.a.w. of London. It is irregularly built, chiefly consisting of two long cross-streets, and is surrounded by villas. The chief trade is in malt and flour. Many vegetables are raised for the London market. Pop. '91, 11,300. C. arose in a monastery founded in 666, and rebuilt in 964 by Edgar and the Benedictine monks. The South Saxon kings had a seat here during the heptarchy. Charles James Fox lived on St. Anne's hill, an abrupt elevation about a mile from the town. Cowley the poet resided in Chertsey.

**JHERUB**, in the plural *cherubim* or *cherubs*, is the Hebrew name of a winged creature with a human countenance, which in the Scriptures is almost always represented in connection with Jehovah, and especially as drawing his chariot-throne. Cherubim are first mentioned in the Old Testament as guards of paradise; a C. with a flaming sword hindered the return of the expelled human pair. In the Holy of Holies in the tabernacle, and afterwards in the temple, cherubim wrought in embossed metal were represented above the mercy-seat, or covering of the ark of the covenant, so that they appeared to rise out of it. Figures of cherubim were also wrought into the hangings of the Holy of Holies. The cherubim that appear in the visions of Ezekiel and the revelations of John depart much from the early representations. In Ezekiel they have the body of a man, whose head, besides a human countenance, has also that of a lion, an ox, and an eagle; they are provided with four wings, two of which support the chariot of Jehovah, and serve to fly, while the other two cover the body; the hands are under the wings, and the whole body is spangled with innumerable eyes. In the revelation, four cherubim, covered with eyes, and having six wings, surround the throne of Jehovah; the first has the face of a lion, the second of an ox, the third of a man, and the fourth of an eagle. This gave rise at a very early period to the symbolical figures of the four evangelists, the human countenance being associated with Matthew, that of the lion with Mark, of the ox with Luke, and of the eagle with John. Most Jewish writers and Christian fathers conceived the cherubim as angels; and Dionysius the Areopagite, in his *Celestial Hierarchy*, makes them a separate class in the first hierarchy. Most theologians also considered them as angels, until Michaelis showed them to be a poetical creation; and Herder, in his *Spirit of Hebrew Poetry*, compared them to the griffins that watch treasures, and other fabulous figures. In Christian art, they are generally represented as sexless figures, with wings from the shoulders, the legs also being either covered by wings, or having wings substituted for them. Very often they have also a glory round the head.

**CHERUBINI**, **MARIA LUIGI CARLO ZENOBIO SALVATORE**, an eminent Italian composer, was born at Florence on the 8th or 14th of Sept., 1760, and was the tenth child of a musician in the Pergola theatre. He began to study music at the age of six, under his father, and composition when nine years of age, under other teachers. His earliest work was a Mass and Credo in D, and by 1776 his list included a Te Deum and an oratorio. Granted an allowance by the grand-duke, he went to Bologna in 1778, spending there and at Milan, four years under Sarti, from whom he acquired his remarkable knowledge of counterpoint and fugue. In 1780 his first opera, *Quinto Fabio*, was produced, and was followed quickly by other dramatic works. In 1784 he went to London and held the post of composer to the king for one year. Here two operas, *La Finta Principessa* and *Giulio Sabino*, were brought out. In 1785 he visited Paris, and later, Turin, and produced *Ifigenia in Aulide* (1787-88), returning in 1788 to make Paris his home. *Démophoon* (1788) indicated that he was adopting a new style, and *Lodoiska* (1791) proved that he had abandoned the light Neapolitan style of his earlier works. Among later operas were *Elise* (1794); *Médée*, (1797); *L'Hôtesse Portugaise* (1798); *Les Deux Journées*, also called *Die Wasserträger*, and considered his operatic masterpiece

(1800); *Anaorson* (1808); and *Ali Baba* (1838), a rewritten work, originally called *Koukourgi* (about 1798).

In 1795 Cherubini was appointed one of the *inspecteurs des études* in the new conservatory of music. In 1806 he went to Vienna to write an opera for the royal theatre, returning discouraged to France in 1806, and after a period of melancholia entered in 1808, during a casual visit to Belgium, on a new field of composition—sacred music, beginning with a Mass in F (1809), and after that date wrote little else. In 1814 he was made a knight of the Legion of Honor by Louis XVIII. In 1815 Cherubini visited London, where he composed a symphony and overtures for the Philharmonic Society. In 1816 he was appointed, with Leseur, musician and superintendent of the king's chapel, and in 1822 director of the Paris conservatoire, which he advanced to the high standard it still preserves. He died at Paris, May 15, 1842. Cherubini has been called "the link between classic idealism and modern romanticism." "His sacred compositions, notably the requiems in C and D (1817 and 1836) are distinguished by a severe grandeur, and his dramatic work by brilliant and original instrumental effects." His work on counterpoint (1835) is still a standard. See the memoirs of Berlioz; Bellasis, *Cherubini* (1874) with catalogue of compositions, and the memoir by Pougin; and Crowest's *Cherubini* (N. Y., 1890).

**CHERUSCI**, a German tribe first mentioned by Cæsar. They first dwelt n. of the Silva Bacensis, or Harz forest, but the exact boundaries of their territory cannot be ascertained. They are chiefly memorable in connection with their great leader Arminius, or Hermann, who, having formed an alliance with other German tribes, attacked and annihilated the Roman legions under Varus, in the forest of Teutoburg, 9 A.D. After the death of Arminius, internal strifes broke out among the C., and Tacitus says that they were subjugated by the Chatti, a neighboring tribe. Notwithstanding this, they again appear as the chief tribe in the military league of the Saxons about the end of the 8d century. In the beginning of the 4th c., they are included among the peoples who had leagued against Constantine, and towards the close of the same are still mentioned distinctively by Claudian.

**CHERVIL**, *Anthriscus cerefolium*, an umbelliferous plant, which has been long cultivated as a pot-herb, and used in soups and for a garnish, etc., in the same manner as parsley. It is much more used in some parts of the continent of Europe than in Britain. It is a native of Europe, naturalized in some parts of England. The leaves have a peculiar, somewhat sweetish, pleasantly aromatic smell and taste, by which the plant may be known from its congener *anthriscus vulgaris* or *scandix anthriscus*, a poisonous weed, whose leaves have a disagreeable smell, and which is also distinguished by its hispid fruit. There is a variety of C. with large roots, for the sake of which it is cultivated.—The umbelliferous plant called VENUS' COMB or SHEPHERD'S NEEDLE (*scandix pecten* or *S. pecten veneris*), a native of Britain and of the continent of Europe, often found in corn-fields, and remarkable for the appearance and large size of its fruit, and another species (*S. australis*) which grows in the s. of Europe, have a taste and smell resembling C., and are used in the same way on the continent. SWEET C. or SWEET CICELY (*myrrhis odorata*; *scandix odorata* of the older botanists), a native of the s. of Europe and of some parts of Asia, common in the neighborhood of houses in Britain, although probably not a true native, is frequently cultivated in Germany under the name of *Spanish C.* or *anis chervil*. In Scotland, the plant is commonly called *myrrh* by the peasantry. Its smell is peculiarly attractive to bees; and the insides of empty hives are sometimes rubbed with its leaves, to induce swarms to enter.—The species of *cherophyllum*, coarse weeds, are also called chervil.

**CHERWELL**, a stream which falls into the Isis or Thames near Oxford, England. The river comes from the county of Northamptonshire into Oxfordshire, of which county it forms the western boundary for a considerable distance.

**CHESAPEAKE BAY**, the largest inlet on the Atlantic coast of the United States, being 200 m. long, and from 4 to 40 broad. Its entrance, 12 m. wide, has, on the n., cape Charles, in lat. 37° 8' n., and long. 76° 2' w.; and on the s., cape Henry, in lat. 36° 56' n., and long. 76° 4' w., both promontories being in Virginia. C. B. has numerous arms, which receive many navigable rivers, such as the Susquehanna and the Patapsco on the n., through Maryland; the James on the s.w., from Virginia; and the Potomac on the w., between these two states. Unlike the shallow sounds in North and South Carolina, this network of gulfs and estuaries, to say nothing of its noble feeders, affords depth of water for ships of any burden, virtually carrying the ocean up to the wharves of Baltimore and the arsenals of Washington.

**CHESAPEAKE**, a magisterial dist. of Elizabeth city, Va.; pop. '90, 9815. Chesapeake city is a vill. in same co.; on Chesapeake bay, near Fort Monroe, and on the New York, Philadelphia, and Norfolk railroad.

**CHESLEDEN**, WILLIAM, an English surgeon and anatomist, was b. in 1688, at Barrow-on-the-Hill, in Leicestershire. He commenced his medical studies at fifteen, at twenty-three established himself as a lecturer on anatomy, and in the following year was elected a fellow of the royal society. He was afterwards appointed surgeon to St. Thomas's, St. George's, and Westminster hospitals, where he acquired great reputation as an operator. In this respect, few surgeons, if any, ever surpassed him. He died at

Bath, 11th April, 1753. C.'s principal works are *Anatomy of the Human Body* (1718), long a text-book on the subject in England; a *Treatise on the Operation for the Stone* (1728); and *Osteology, or Anatomy of the Bones* (1733). He also contributed several valuable papers to the philosophical transactions of the royal society.

**CHESHIRE**, a co. in s.w. New Hampshire, bordering on Vermont and Massachusetts, bounded on the w. by the Connecticut and drained by the Ashuelot river, and traversed by the Boston and Maine and the Fitchburg railroads; 784 sq. m.; pop. '80, 29,579. It has a hilly surface, with some mountains, the highest being Grand Monadnock. There are several small lakes and ponds in the county. The soil is fertile, particularly along the rivers. The chief productions are grain, potatoes, hay, wool, butter, cheese, and maple sugar; and there are also many manufactories. Co. seat, Keene.

**CHESHIRE**, a maritime co. in the w. of England, bounded n. by the river Mersey, and partly also by the Irish sea, in lat. 52° 56' to 53° 54' n., long. 1° 47' to 3° 11' west. Its greatest length from n.e. to s.w. is 58 m.; greatest breadth, 32; area, 1052 sq.m., of which only  $\frac{1}{4}$  is uncultivated; circuit, 200 m., of which 8 are coast. The surface forms an extensive nearly level plain between the Derbyshire and Welsh mountains, well wooded, and studded with small lakes or meres, and chiefly occupied by grazing and dairy tracts, which are among the most important in England. This plain, comprising four fifths of the surface, rests on new red sandstone, and is crossed, near the middle, by a tract of high ground running s.w. from a promontory overlooking the Mersey, near the mouth of the Weaver, to Beeston castle rock, 366 ft. high. On the e. border of the co. is a line of new red sandstone hills. In the n.e. is part of the Lancashire coal-field. In the e. are large tracts of peat, and much of the co. is wet and rushy. The n.w. part of C. forms a hammer-headed peninsula called Wirral, about 8 m. broad, between the estuaries of the Dee and Mersey. Coal-measures appear on the w. side of this peninsula, as well as on the w. border of the main part of the county. The chief rivers are the Dee, Mersey, and Weaver, which are navigable. The Dee skirts the co. on the w. 55 m., and the Mersey on the n. for 40 miles. The Weaver rises in the e. part of the co., and runs 40 m. w.n.w. into the Mersey. The co. contains an almost unrivaled system of canals, including the celebrated Bridgewater canal, and is traversed by the main line of the London and Liverpool railway, and the Crewe, Chester, and Holyhead railway. The chief mineral products are rock-salt and coal. The rock-salt, discovered in 1670, and mined by gunpowder, is found near the Weaver and its branches, especially near Norwich, at the depth of 28 to 48 yards, in two beds, the upper one being 15 to 25 yards, and the lower one above 40 yards thick, under a stratum of hard rock, 25 to 35 yards thick. The mines, one occupying 85 acres, when lighted up, resemble a fairy palace sparkling with gems and crystal. Much salt is also made from brine-springs 20 to 40 yards deep. Coal is worked in the n.e. part of the county. There are also lead (with cobalt) and copper-mines, and in almost every part of the co. freestone, limestone, millstone, and marl are found. The climate is moist. The soil is mostly a clayey or sandy loam, with marl and peat, and very fertile. The soil and climate are well fitted for pasturing, dairy-farming, and cheese-making, which are the chief agricultural occupations. The hedgerows abound in oaks. C. is a manufacturing as well as an agricultural county. Its chief products are silk, cotton, ribbons, fancy goods, linen, shoes, hats, chemicals, nails, rope, flies, etc. Shipbuilding is carried on to a considerable extent. Pop. in 1891, 730,058. The chief towns are Chester (the co. town) Macclesfield, Stockport, Congleton, Knutsford, and Birkenhead. The co. of C. returns 6 members to parliament. C. has some Roman roads, tumuli, barrows, remains of religious houses, and many old castles and halls. The 12th Roman legion occupied Chester till the 3d century. Egbert, in 828, added C. to the Anglo-Saxon kingdom of Mercia. William the conqueror erected C. into a co. palatine, under Hugh Lupus, with an independent parliament and 8 barons. Henry VIII. subordinated it to the English crown; but C. did not send representatives to the English parliament till 1549, and the separate jurisdiction ceased entirely only in 1831.

**CHESNE**, ANDRÉ DU. See DUCHESNE.

**CHESNEY**, CHARLES CORNWALLIS, 1826-76; a brevet-col. in the British royal engineers, who first attracted attention by *A Military View of Recent Campaigns in Virginia and Maryland*, published in 1863, which was followed two years later by *Campaigns in Virginia and Maryland*, both works having reference to the late civil war in the United States. The work from which he received the greatest fame at home was *Waterloo Lectures*. He published, also, *The Military Resources of Prussia and France*; *Recent Changes in the Art of War*; and *Essays in Modern Military Biography*.

**CHESNEY**, FRANCIS RAWDON, 1789-1872, a British soldier who projected and led the Euphrates expedition by an overland route to India in 1835-6. He was a brig.gen. in China in 1843, maj.gen. in 1855, and gen. in 1868. He wrote *Expedition for the Survey of Euphrates and Tigris*; *Observations on the Past and Present States of Fire-arms*; *Russo-Turkish Campaigns of 1828-29*; and *Narrative of the Euphrates Expedition*.

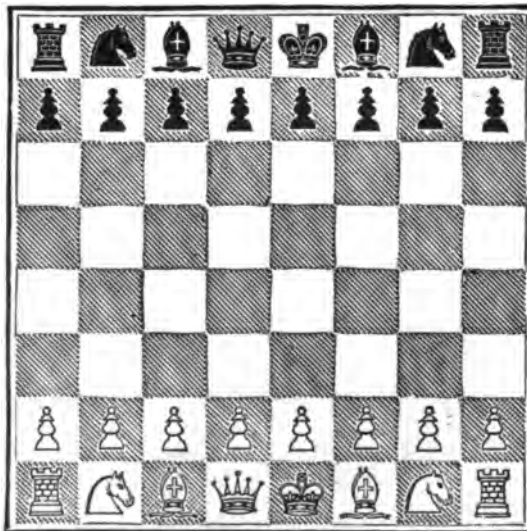
**CHESS** (Fr. *échecs*, Ger. *schach*). The origin of this, the most purely intellectual of all games of skill, has been much disputed; thus much may now be considered as certain, that, under the Sanscrit name of *chaturanga*, a game, essentially the same as modern C., was played in Hindustan nearly 5,000 years ago. In its gradual diffusion through the world in succeeding ages, the game has undergone many alterations and modifications, both in nature and in name; but marked traces of its early Asiatic origin and descent are still discerned by the learned in its nomenclature and other characteristics. From Hindustan, C. spread into Persia, and thence into Arabia. The Arabs, it would appear, in the 8th c., introduced the game into Spain and the rest of western Europe; and in England, chess-play seems to have been known prior to the Norman conquest. Into Constantinople, and probably some other cities of eastern Europe, the game may have been imported from Persia at a period earlier than its Moorish conveyance into Spain.

The original Hindu game was played on a board of sixty-four squares, as now, but by *four persons*, two being allied against two, as in whist. Hence the name *chaturanga*, from *chatur*, "four," and *anga*, "a member" or "component part." The name *shatranj*, used by the Persians and Arabs, is a corruption of the Sanscrit. The English, French, and other European names are derived from the Persian term *shah*, "king." *Check*, the warning when the king is in danger, is but another form of *shah*; in fact, "king" is sometimes used for "check," and in German *schach* is both the name of the game and the term of warning. The term *rook* is from the Sans. *roka*, Pers. *ruk*, meaning a ship or chariot; *pawn* is said to be from *peon*, an attendant, or foot-soldier.

The books written upon C. "would form a tolerably large library." Of works on the antiquities of the subject, we may mention Dr. D. Forbes's *History of Chess* (Lond. 1860). The best modern practical works on the art of chess-play are the *Chessplayer's Handbook*; C. Frazis; and *Chess: Theory and Practice*, by Staunton; Morphy's *Games at C.*, edited by Lowenthal; Jaenisch's *Treatise on the Openings*, translated by Walker; and Horwitz and Kling's *Collection of End-games*. See also O. Cordel, *Führer durch die Schachtheorie* (Berlin, 1888).

The game of C. is played upon a square board marked out into sixty-four square divisions, which are colored alternately black and white, in order the more clearly to determine and denote the respective movements of the several pieces. In placing the board for play, each player must always have a *white* corner square at his right hand. There are two sets of pieces, of opposite colors, of sixteen men each, and of various powers according to their rank. These sets of men are arrayed opposite to each other, and attack, defend, and capture, like hostile armies. The accompanying diagram will best explain the name, form, and place of each man at the commencement of the game:

## BLACK.



Rook. Knight. Bishop. Queen. King. Bishop. Knight. Rook.  
WHITE.

The superior officers occupying the first row on each side are called *pieces*; the inferior men, all alike, standing on the row immediately in front of the pieces, are called *pawns*. Their moves and powers, along with the peculiar terms used in C., may be briefly described as follows:

A *pawn*, at his *first* move, may advance either one or two squares, straightforward; but after having once moved, he can only advance a single square at a time. In capturing\* an adverse piece, however, a pawn moves one square diagonally, either right or left; but the pawn never moves backward. On arriving at an 8th square, or the extreme line of the board, a pawn may be exchanged for any piece his owner chooses to call for, except a king, so that a player may have several queens on the board at once. If, on moving two squares, a pawn pass by an adverse pawn which has arrived at the 5th line, the advanced adverse pawn may take the other *in passing* in exactly the same manner as if the latter had moved but one square.

A bishop moves any number of squares diagonally, but diagonally only; therefore a bishop can never change the color of his square.

A knight moves two squares, so as always to change color—that is, he moves one square forward or backward, and one diagonally. On account of this crooked movement, he can leap over or between any surrounding pieces; and therefore a knight's check—unless he can be taken—always compels the king to move.

The rook, or castle, moves any number of squares forward, backward, or sidewise, but not diagonally.

The queen is by far the most powerful of the pieces, and moves over any number of squares, either in straight lines or diagonals, forward, backward, or sidewise; so that her action is a union of that of the rook and bishop. At starting, the queen always stands on a square of her own color.

\* The king is the most important piece on the board, as the game depends upon his safety. He moves only one square at once, in any direction, except when he *castles*—a term to be explained presently. The king cannot be taken; but when any other piece attacks him, he is said to be in *check*, and must either move out of check or interpose some one of his subjects, unless the checking piece can be captured. When there is no means of rescuing the king from check, he is said to be checkmated, and the game is over. Of course, the two kings can never meet, as they would be in check to each other. *Double-check* is when a piece, by being moved, not only gives check itself, but also discovers a previously masked attack from another.

*Castling* is a privilege allowed to the king once in a game. The move is performed either with the king's rook or queen's rook—in the former case, the king is moved to the king's knight's square, and the king's rook is placed on the king's bishop's square; in the latter case, the king is played to the queen's bishop's square, and the queen's rook is played to the queen's square. But the king cannot *castle* after having once moved, nor at a moment when he is actually in check, nor with a rook that has moved, nor when he passes over a square attacked or checked by an adverse piece, nor when any piece stands between him and the rook with which he would *castle*, nor when in the act of *castling* either the king or rook would have to capture an adverse piece.

A *drawn* game results from neither player being able to checkmate the other: thus, a king left alone on each side must of course produce a draw, as do also a king with a bishop, or a knight, against a king.

*Stalemate*, or the not being able to move either the king or any other piece, also constitutes a drawn game.

*Odds* is a term applied to the advantage which a stronger player should give to a weaker: thus, the removal of a rook or knight from the better player's forces may be fair odds; or if the players are more nearly matched, the one may give a pawn. When the odds of a pawn are given, it is always understood to be the king's bishop's pawn.

*Gambit* is a technical word implying the sacrifice of a pawn early in the game, for the purpose of taking up an attacking position with the pieces.

Supposing the worth of a pawn to be represented by unity, the following is a tolerable average estimate of the comparative value of the pieces: Pawn 1, bishop 3, knight 3, king 4, rook 5, queen 9.

The chess-men being placed, the players begin the engagement by moving alternately; each aiming to gain a numerical superiority by capturing his opponent's men, as well as such advantages of position as may conduce to victory.

The rows of squares running straight up and down the board are called *files*, those running from side to side are called *lines*, and those running obliquely across are termed *diagonals*.

The playing over the following short game will serve the learner as a little initiatory practice:

## WHITE.

1. King's Pawn two.
2. King's Bishop to Queen's Bishop's 4th.
3. Queen to King's Rook's 5th.
4. Queen takes King's Bishop's Pawn, giving Black checkmate.

## BLACK.

1. King's Pawn two.
2. King's Bishop to Q Bp's 4th.
3. King's Knight to K Bp's 8d.

\* Taking is always performed by lifting the captured man from the board, and placing the captor on his square. The pawn is the only man whose mode of taking differs from his ordinary move.

The foregoing brief mode of giving a checkmate is called the *Scholar's mate*, and is often practiced upon young and unwary players. Any contractions used, such as "K" for king, "B" for bishop, etc., will readily be understood by the use of the diagrams.

In the conduct of the game, and in the practice of C., the following rules, precepts, and hints will be found very generally useful:

Play forth your minor pieces early, and castle your king in good time. You may sometimes delay castling with advantage, but not often.

Do not expect to be able to establish an enduring attack with half your forces at home.

Seek to let your style of play be attacking; and remember the gaining or losing of time in your measures is the element of winning or losing the game.

Never touch a piece without moving it, nor suffer yourself or your opponent to infringe any other of the laws of the game.

You will find, when first player, that the opening, springing from your playing 1st king's pawn two, and then your king's knight to the bishop's 8d, is one of the best that you can adopt; but do not adhere to any one opening only.

If you wish to adopt a purely defensive opening, you may play 1st king's pawn one, and follow up with Q P 2, and Q B P 2.

Next to playing with good players, nothing will conduce to improvement more than looking on at two expert players whilst they play. Wanting these advantages, it is best to play over openings, and actual games, from books or journals.

To prevent blunders and oversights, always endeavor to perceive the motive of your adversary's move before you play; and look often round the board to see that you are not losing sight of any better move than the one you intended, or that you are not suffering yourself to be tempted by a bait.

When an onlooker, never interfere.

Always endeavor to lose with good temper, and to bear your adversary's faults with a good grace.

**THE LAWS OF CHESS.**—The laws of C. are at present in a somewhat unsettled, unsatisfactory condition; but the following are the principal prevailing regulations of the game:

1. If any error have been committed in the placing of the board or men, either player may claim that the game shall be finished as it stands, after four moves have been completed on each side, but not else.

2. A move once made, by your having moved a piece and left hold of it, cannot be retracted.

3. If you touch a piece, you must play that piece; but as long as you retain your hold, you can play it where you like. If you touch a piece that cannot move, your opponent may compel you to play your king, unless the king be unable to move. When you touch your pieces for the mere purpose of adjusting them, you are bound to say so.

4. If you make a false move, your opponent may either cause you to retract it and move your king, or he may claim that the false move shall stand, or that you shall make a legal move with the same piece, at his pleasure.

5. If you touch one of your opponent's men, he may compel you to take that man; or if that be impossible, to move your king, provided he can move without going into check.

6. If on the king being checked, due notice is not given, the player whose king is attacked is not bound to notice it.

7. In every fresh game, except when one is drawn, the first move alternates.

8. Drawn games counting as no games at all, the player who had the first move in a drawn game is also entitled to it in the next. (This absurd regulation is fast becoming obsolete; and it is now a common agreement in playing a series of games, that the move shall invariably alternate.)

9. A player who gives the odds of a piece, is entitled to the first move.

10. The time for consideration of a move is not limited; but a player leaving a game unfinished without his opponent's permission, loses such game.

11. When at the end of a game one player is left with just sufficient superiority of force to win—such as a king and rook against king, king and two bishops, or king, knight, and bishop against king—he who has the greater force must give checkmate within fifty moves on each side, or else the game is adjudged to be drawn. This law is framed to prevent unskillful players from wearying their opponents by persisting in the attempt to accomplish what they are too untutored to effect; and it is perfectly just, since the allotted number of moves is amply large enough and to spare.

12. In case of any dispute about the laws, both players are to agree as to an umpire, whose decision is to be considered final.

As there is no branch of chess-study better calculated to advance the skill of a learner than the attentively playing over recorded games between first-rate players, we have given an example of a game played blindfold, simultaneously with five other games, by the celebrated American chess-player, Paul Morphy. This gentleman visited England and the continent of Europe in 1858, and in his contests with the best players fairly carried all before him, so that he soon ranked as the greatest chess-player living.

## White—Mr. Morphy.

1. P to K 4.
2. K Kt to B 3.
3. K B to Q B 4.
4. P to Q Kt 4.
5. P to Q B 3.
6. P to Q 4.
7. Castles.
8. Q B to R 3.
9. Q to Q Kt 3.
10. Q Kt takes P.
11. Q takes B.
12. Q R to Q.
13. P to K R 3.
14. Kt takes Kt.
15. B to K 2.
16. P to K B 4.
17. K B to B 4, ch.
18. Q B to Kt 2.
19. Q R to K.
20. P takes P.
21. R to K 8.
22. Q takes R.
23. Q takes Kt P, ch.
24. P to K B 6.
25. K takes Q.
26. K takes B.
27. R to K Kt, and wins.

## Black—Mr. C—.

1. P to K 4.
2. Q Kt to B 3.
3. K B to Q B 4.
4. B takes Kt P.
5. B to Q R 4.
6. P takes P.
7. P takes P.
8. P to Q 3.
9. K Kt to R 3.
10. K B takes Kt.
11. Castles.
12. Kt to K Kt 5.
13. K Kt to K 4.
14. Kt takes Kt.
15. P to K B 4.
16. Kt to Q B 3.
17. K to R.
18. Q to K 2.
19. R to B 3.
20. Q to K B squ.
21. Q takes R.
22. Q to K 2.
23. Q takes Q.
24. Q takes Kt P, ch.
25. B takes P, ch.
26. P to K R 4.

**CHESS**, or **CHEAT**, common names of the *bromus secalinus*, a plant of the order *graminaceæ*; a troublesome weed that frequently springs up in wheat-fields, the seed mixing with the true wheat, from which it can be separated only with difficulty. It was once generally believed among farmers that wheat itself was transmuted into chess.

**CHEST, MILITARY**, is a technical name for the money and negotiable securities carried with an army, and intended to defray the current expenses. In the regular military system, this department is managed by the commissariat.

**CHEST, NAVAL**. The name of C. has been given to certain funds, maintained for the benefit of seamen belonging to the Eng. navy. A fund, called the *Chest at Chatham*, was suggested so long ago as the days of Drake and Hawkins, for the relief of wounded and superannuated seamen. In 1590, all seafaring men in queen Elizabeth's service consented to a stoppage out of their pay of 2d. to 6d. per month, to support this fund. The money was not in those days, as it would be now, put out to interest; it was kept in a C., and hence the name given to the fund itself. During the 18th c., the system became organized in a better manner; but still the fund retained the name of C.; insomuch that when the office was removed from Chatham to Greenwich, in 1803, it became the *Chest at Greenwich*. The C. is managed *ex officio*, and the accounts are annually laid before parliament. Handsome gifts are occasionally made to the fund by individuals. Disabled sailors receive a present sum of money, if not deprived of the power of earning a living; but if their injuries are more permanent, they receive a pension from the C., for one year, or for several years, or for life, paid half-yearly.

**CHEST**, or **THO'RAX**, in anatomy, is the part of the body which lies beneath the neck and above the abdomen (q.v.), constituting the uppermost of the two divisions of the trunk, or that which contains the heart and lungs, and is bounded externally by the ribs. The C. is somewhat conical in form, the broad or lower end of the cone being shut in by the diaphragm, a large muscular partition which projects upwards from the lower ribs, being convex towards the C., and concave towards the abdomen. In respiration (q.v.), the diaphragm descends by its own muscular contraction, while at the same time the ribs are drawn upwards and outwards by the intercostal muscles. The cavity of the C. is thus enlarged, the lungs are expanded, and air is drawn into them through the trachea or windpipe and bronchial tubes. The combination of bone, cartilage, muscle, and tendon entering into the composition of the C. is such as to permit of expansion-movement to the extent required, and yet to guard against over-expansion, which would be fatal to the delicate textures within. The bones of the C. are at the same time a powerful protection against external injury.

The structures forming the walls of the C. are: 1. The backbone or spinal column, divided into 24 vertebræ, 12 of which, called the dorsal vertebræ, form the thoracic portion. 2. Twelve ribs, attached to the transverse processes or projecting portions of the dorsal vertebræ, and ending in front in the costal cartilages, by which the ribs are connected with. 3. The sternum or breast-bone, which occupies the middle line. 4. The diaphragm (q.v.). See also **SKELETON**.

The contents of the C. are the heart, the great arteries and veins, the lungs, the

trachea or windpipe, the bronchi or branches of the trachea, leading to the lungs, the œsophagus or gullet, and the thoracic duct (q.v.), or general terminus of the lymphatic system of vessels, by which the chyle and lymph are discharged into the blood. The very great importance of these parts to life, and their great liability to deranged action, renders the C. the seat of a large proportion of the diseases which afflict humanity, and especially of those which end in death. Indeed, of the three organs which the great physiologist, Bichat, called the "tripod of life"—viz., the brain, heart, and lungs—the C. contains two; hence its condition in almost all diseases, and especially in fatal diseases, is an object of the utmost solicitude to the physician.

The diseases of the C. depend in some cases on alterations in its form, as by rickets (q.v.) and other diseases affecting the bones in early childhood or in youth, as by too tight lacing in girls. The lungs and air-tubes are subject to a great variety of diseases, among which the principal are consumption or phthisis pulmonalis, pneumonia, pleurisy, bronchitis or pulmonary catarrh. The heart is subject to pericarditis, endocarditis, and chronic organic disease of the valves, as well as to enlargement (hypertrophy), dilatation, and degenerations of its muscular texture. The aorta, or great artery, is often affected with degeneration of its walls, and occasionally with aneurism. The great veins are liable to over-distension, and to obstruction by tumors or by coagulation of the contained blood. The thoracic duct is also sometimes obstructed by external pressure; and the œsophagus has a number of diseases usually described in connection with the alimentary canal. Most of the diseases here referred to are described either under special articles, or under HEART and RESPIRATION, ORGANS OF.

The examination of the C. by physicians is now conducted not only by an investigation of the symptoms or obvious characters of the disease, but by a minute and elaborate examination into the physical condition of the contained organs by means of auscultation (q.v.), percussion (q.v.), measurement, etc. The application of these methods is too complicated and technical for explanation in detail, but their results will be shortly alluded to incidentally in the articles above referred to on the diseases of the chest. The name of Laennec (q.v.) will be long remembered in medicine as that of a great original observer, who has contributed more than any other to the progress of knowledge in this department.

**CHESTER**, a co. in s.e. Pennsylvania, on the Delaware and Maryland borders, traversed by the Pennsylvania, the Philadelphia, Wilmington and Baltimore, the Philadelphia and Reading, and other railroads; 764 sq. m.; pop. '90, 89,377. Co. seat, West Chester.

**CHESTER**, a co. in n. South Carolina, between the Catawba and Broad rivers. Area, 570 sq. m.; pop. '90, 26,600. Co. seat, Chester.

**CHESTER**, a co. in s. western Tennessee; 288 sq. m.; pop. '90, 9069. Co. seat, Henderson.

**CHESTER**, a city in Delaware co., Penn., on the Delaware River, 15 miles w.s.w. of Philadelphia. It was founded by the Swedes in 1644, and is the oldest town in the state. It contains churches, banks, library, electric street railways, public schools, an academy, and the Pennsylvania Military Academy; and the Swarthmore College, belonging to the Friends, and Crozer Theological Seminary (Baptist), are near the city. Chester has large manufactories of cotton and woolen goods, steel, boilers, and engines; but is most famous for its shipbuilding. The Delaware River Iron Shipbuilding Works, founded by John Roach in 1872, built many vessels for the navy, and fine steamships for the Old Dominion and Mallory's lines, and for the Pacific Mail Steamship Company. Pop. '90, 20,226.

**CHESTER**, an ancient and episcopal city, municipal and parliamentary borough, and river-port, the capital of Cheshire, on the right bank of the Dee, 22 m. from the mouth of its estuary, 16 m. s.e. of Liverpool. It stands on a rocky sandstone height, and is mostly inclosed in an oblong quadrangle of ancient walls, 7 or 8 ft. thick, nearly 2 m. in circuit, and with 4 gates, and now forming a promenade with parapets, where two persons can walk abreast. The two main streets cross each other at right angles, and were cut out of the rock by the Romans 4 to 10 ft. below the level of the houses. The houses in these streets are curiously arranged; the front parts of their second stories, as far back as 16 ft., form a continuous paved promenade or covered gallery, open in front, where there are pillars and steps up from the street below, with private houses above, inferior shops and warehouses below, and the chief shops of the town within. This arrangement, called the "rows," together with the ancient walls, and the half-timbered construction of many of the houses, with quaintly carved ornamental gables of the 16th c. render C. perhaps the most picturesque city in England. C. cathedral is an irregular massive structure of crumbling sandstone, 375 by 200 ft., with a tower of 127 feet. It was formerly the church of the abbey of St. Werburgh, and for 650 years was one of the richest in England. The cathedral grammar school was founded by Henry VIII. St. John's church, now partially in ruins, is supposed to have been founded by Ethelred in 608. Among other noted buildings are the castle built by William the Conqueror, the chapter-house, blue-coat school, museum, and diocesan training college. The Dee is crossed by a superb stone arch of 200 ft. span. Suburbs of villas have recently arisen outside the walls; and a public park, presented by the marquis of Westminster, was opened in 1867. The C. railway station is the center of several important railways, and



is one of the largest and finest in the kingdom. C. has manufactures of lead, iron-foundries, chemical works, and an iron-shipbuilding yard. It manufactures boots and shoes for export. C. has many charitable and religious institutions, and is the abode of many wealthy families. Pop. '91, 37,105. The city is a county in itself, and returns one member to parliament.

C. was *Devana Castra*, or Colonia Devana, an important Roman station, and has yielded many Roman remains—as masonry, coins, inscriptions, fibulae, altars, a hypocaust, and a statue of Pallas. C. was only in 828 taken by the Saxons from the Britons. Its strength made it a refuge against the descents of the Danes and Northmen, but the Danes took it in 894. Ethelfrida retook it in 904, and rebuilt the walls. From the Norman conquest to the time of Henry III., the earls of C. had their own courts and parliaments at C., with 8 subfeudatories and the superiors of the great religious houses, C. being then a county palatine. Henry III. made his eldest son earl of C., a title held since by the prince of Wales. Llewelyn ravaged C. in 1255. The 25 famous C. mysteries or religious plays, by Randle, a monk (1250–60), were acted in the church. After a long siege, the parliamentary forces defeated those of Charles I. at C., and took the city. Pearson and Porteus were bishops of Chester. Trinity church contains the remains of Matthew Henry, the biblical commentator. The commerce of C. has steadily declined since the rise of Liverpool.

**CHESTERFIELD**, a co. in n.e. South Carolina, intersected by the Atlantic Coast Line railroad; 986 sq. m.; pop. '90, 18,468, includ. colored. Productions chiefly agricultural. Co. seat, Chesterfield.

**CHESTERFIELD**, a co. in s.e. Virginia, between the Appomattox and the James river, traversed by the Southern and the Atlantic Coast Line railroads; 465 sq. m.; pop. '90, 28,211, includ. colored. Coal is abundant, but agriculture is the chief business, and corn and tobacco are the principal crops. Co. seat, Chesterfield.

**CHESTERFIELD**, a municipal borough in Derbyshire, near the Hipper and Rother rivulets, 24 m. n.n.e. of Derby by rail. There are manufactures of leather, silk, lace, earthenware, and machinery; and there are several blasting-furnaces in the neighborhood. The manufactures are increasing rapidly, and the minerals in the neighborhood, including coal, iron, potters' and brick clay, slates, and lead, are being greatly developed. The population was, in 1851, 7,100; in 1891, 18,242. Trade is facilitated by a canal connecting C. with the Trent, and by the main line of the Midland railway.

**CHESTERFIELD**, Earl of (PHILIP DORMER STANHOPE), an English statesman and author, eldest son of the third earl of C., was b. in London, Sept. 22, 1694, and studied at Cambridge. In 1714, he made the tour of Europe, and the following year was appointed a gentleman of the bedchamber to the prince of Wales. About the same time, he was elected M.P. for St. Germans, in Cornwall. In 1728, on his father's death, he became earl of C., and in 1727 was sworn a privy-councillor. In 1728, he was appointed ambassador extraordinary to Holland, and in 1730 was made a knight of the garter and lord steward of the household, but soon resigned that office. An eloquent and frequent speaker, he took an active part in all the important business in the house of lords, and was for several years the strenuous opponent of sir Robert Walpole, then premier. In 1744, he connected himself with the administration, and in 1745 was reappointed ambassador to the Hague, but was soon nominated lord-lieut. of Ireland, where he rendered himself exceedingly popular. In Oct., 1746, he became one of the principal secretaries of state, but, two years after, declining health caused him to resign office, and in 1752 he was seized with deafness. Distinguished by brilliancy of wit, polished grace of manners, and elegance of conversation, he lived in intimacy with Pope, Swift, Bolingbroke, and other eminent men of the day. Dr. Johnson, whose dictionary, on its appearance, he affected to recommend, called him "a wit among lords, and a lord among wits." He wrote several papers, on temporary subjects, in *The Craftsman*, *The World*, periodicals of the time; but he is now best known by his *Letters to his Son*, Philip Dormer, written for the improvement of his manners. These letters have been often republished, and they afford a good idea of the mental and moral calibre of the author. Lord C. died Mar. 24, 1773.

**CHESTERFIELD INLET**, a long and narrow gulf, penetrating to the westward from the n.w. of Hudson's bay. Its extreme dimensions are 250 and 25 m.; and the lat. and long. of its mouth are 68° 30' n., and 90° 40' west. C. I. is studded nearly throughout with islands.

**CHESTNUT**, *Castanea*, a genus of plants of the natural order *cupulifera*, closely allied to the beech (*fagus*), and distinguished from it by long male catkins, longitudinally set with groups of flowers, a 5 to 8-celled ovary, and compressed rounded nuts. The name is derived from the town of Castanum, near Magnesia, in Asia Minor. The COMMON C., SPANISH C., or SWEET C. (*C. vulgaris*), is said to have been first brought from Asia Minor to Sardinia, and from thence to have gradually extended over the s. of Europe, where it has long been naturalized, and forms extensive woods. It is an ornamental, stately, or, in exposed situations, a very spreading tree, of great size and longevity; the still surviving C. of Totworth in England was known as a boundary-mark in the reign of king John. A celebrated C. tree on Mt. Etna measured 204 ft. in circumference of trunk. The C. has oblongo-lanceolate, acuminate, serrated, smooth leaves. The timber is dura-

ble and hard, and is used in house-building, for making furniture, and for many other purposes. The timber of the C. so much resembles that of the oak, as in old buildings to be distinguished with difficulty. The bark is used for tanning, but is worth only about half the price of oak-bark. Young C. trees are much esteemed for hop and espalier poles. The C. is therefore frequently grown in England as coppice-wood; but it succeeds well as a timber-tree even in Scotland, although it does not generally ripen its fruit. In Devonshire, however, and in some other parts of England, it is planted to a considerable extent as a fruit-tree. It succeeds throughout all the middle latitudes of Germany, but dislikes a damp foggy atmosphere. It prefers a dry light soil, and succeeds only where there is a dry subsoil. The nuts are generally two in each husk. They form a principal part of the food of the poor in the s. of Europe, being used either roasted or boiled, and often ground into flour, and made into a kind of bread. They contain 15 per cent of sugar, and by pressure yield a sugary juice, which readily undergoes the vinous fermentation, and from which a crumb-like kind of sugar may be obtained. The best kinds of chestnuts are called by the French *marrons*. When cultivated as a fruit-tree, the C. is generally grafted, by which means the better varieties are secured.—Other species of C. also bear eatable fruits: those of the AMERICAN C. (*C. Americana*), a tree much resembling the common C., and of the DWARF C., or CHINQUAPIN (*C. pumila*), a low tree, or more generally a shrub of 7 to 8 ft. high, are used in America. The fruit of the dwarf C. is of the size of a common hazel-nut; the nut is convex on both sides. The plant reaches its southern limit on the banks of the Delaware.—A number of species are natives of the east. The inhabitants of the mountains of Java eat the fruit of the SILVERY C. (*C. argentea*), and the TUNGURRUT (*C. tungurru*), boiled or roasted, like the common chestnut. Both of these are large trees, the tungurru reaching a height of 150 ft.—The horse C. (q.v.) is entirely different from the true chestnut. See *illus.*, HAZEL, *ETC.*, vol. VII.

**CHESEBROUGH LAKE**, an expansion of Penobscot river in Piscataquis co., Me., about 24 m. long by 2 to 4 m. wide.

**CHEVAL GLASS** (Fr. *chevalet*, an easel). A large mirror swinging in a frame.

**CHEVALIER** (Fr. *cheval*, a horse), in heraldry, a horseman armed at all points. In the more general acceptance it signifies a knight (q.v.). See also BANNERET and CHIVALRY.

**CHEVALIER D'INDUSTRIE** (French). One of the swell mob; a swindler. Synonyms are COQUIN, ESCROC.

**CHEVALIER, THE YOUNG**. This title was given by popular assent to the grandson of James II. of England, otherwise known as the Young Pretender (q.v.). See STUART CHARLES EDWARD LOUIS CASIMIR.

**CHEVALIER, MICHEL**, an eminent French economist, born at Limoges, Jan. 13, 1806, was at the age of 18 admitted a pupil of the polytechnic school. Thence he went to the school of mines, and some days before the revolution of July, he was attached as an engineer to the department du Nord. Led away by the theories of the St. Simonians, he was for two years editor of the *Globe*, the organ of that sect. Joining the schism of M. Enfantin, he took an active part in the compilation of the *Livre Nouveau*, the standard of their doctrines, and in 1832 suffered six months' imprisonment, on account of his free speculations in regard to religious and social questions, being regarded as an outrage on public morals. On his liberation, he at once retracted all that he had written in the *Globe* contrary to Christianity, and against marriage, and obtained from M. Thiers a special mission to the United States, to inquire into the systems of water and railway communication there. The results were published in his *Letters from North America* (1836, 2 vols. 8vo). After a visit to England, he issued a work, entitled *Material Interests in France: Public Works, Roads, Canals, Railways* (1838, 8vo). He was named, successively, chevalier of the legion of honor, councillor of state (1838), a member of the superior council of commerce, and of the royal council of the university; and in 1840, professor of political economy in the college of France. In 1840, he was re-established in the corps of mines as engineer of the first-class; and in 1846, elected a member of the chamber of deputies. Under the republic, he lost his various employments. He published, in 1848, *Letters on the Organisation of Labor and the Question of the Laborers*; and after the *coup d'état* of Dec. 2 was restored to his professorship, and named councillor of state. In 1860, C. assisted Mr. Cobden in carrying into effect the commercial treaty between France and England, and was created a senator. He became a grand officer of the legion of honor, 1861. He d. at Montpellier, 1879.

**CHEVAUX-DE-FRISE**, in fortification, is a hastily constructed substitute for a regular abattis, to stay the progress of an advancing enemy. It may be constructed in any way of wood or iron, provided it presents an array of sharp or ragged points towards the enemy. Sometimes it is made of barrels or centers of timber, with spears springing out from all sides, in such a way as to constitute both a support and a defense. Among the *matériel* of an army under the care of the engineers, are sometimes comprised *chevaux-de-frise* formed of cylindrical iron barrels, about 6 feet long, each having 12 holes to receive as many spears; the spears can be packed away in the barrel, when not in use. Each such piece constitutes a *cheval*; and many such, ranged end to end, form *chevaux*, to be used in ditches around a fortification, on the berme beneath the parapet, behind

the glacis, across a breach in the rampart, or in any spot where a check to the storming-party is needed. At Badajoz, during the peninsular war, great service was rendered by a chevaux-de-frise formed of sword-blades fixed into beams of wood. The name is said to have been derived from "Friesland horse," and to have been first applied by the French during the wars of the 17th century. See *illus.*, **FORTIFICATION**, vol. VI., fig. 23.

**CHEVERUS**, JEAN LOUIS ANNE MADELEINE LEFEBVRE DE, D.D., 1768-1836; the first Roman Catholic bishop in New England. He was raised to the priesthood in 1790, and had a curacy at Mayence, in France; but on refusing to take the oath required by the assembly he went to England, and in 1795 came to America and joined the Roman Catholic mission in Boston. He spent some months in Maine as an Indian missionary. During the prevalence of the yellow fever in Boston his faithful and efficient service, without regard to sect or belief, made him remarkably popular, and when he started a subscription for funds to build a church of his faith, John Adams, then president of the United States, headed the list. In 1808, he was made bishop against his own protest. In 1823, he was recalled to France, and made bishop of Montauban, and still later bishop of Bordeaux and peer of France. He was appointed a cardinal Feb. 1, 1836.

**CHEVES**, LANGDON, LL.D., 1776-1857; a native of South Carolina; elected to the state assembly in 1808; and to congress in 1811, serving five years, for a part of the time being speaker of the house, in which position he gave the casting vote that defeated the rechartering of the U. S. bank; but in 1819 he became president of the same bank. He was chief commissioner in settling some of the provisions of the treaty of Ghent. In 1850 he was a delegate to the Nashville national convention, and in 1852, a member of the South Carolina state convention, in which he opposed a separate state secession.

**CHEVET.** See **APPE**.

**CHEVIOT HILLS**, a mountain-range occupying contiguous parts of the counties of Northumberland and Roxburgh, on the English and Scotch borders, and running 35 m. from near the junction of the Till and Tweed in the n.e. to the sources of the Liddel in the s.w. The highest points are C. hill, 2658 ft., and Carter Fell, 1850.

**CHEVREUL**, MICHEL EUGÈNE, a distinguished French chemist, b. Aug. 31, 1786, at Angers, in the department of Maine-et-Loire. In 1820, he was made an examiner in the polytechnic school; and in 1824, director of the dyeing department in the manufactory of the Gobelins. This last position led him to institute a series of accurate researches on colors, the results of which he made known in a series of *Mémoires* of the academy of sciences. Previous to this, C. had made himself known in the scientific world by a variety of researches and writings. In 1826, he was made a member of the academy; and in 1830, professor of applied chemistry in the museum of natural history. Besides a great number of articles in the *Journal des Savants*, beginning with 1820, the following works of C. deserve mention: *Leçons de Chimie appliquée à la Teinture* (1828-31); *De la Loi du Contraste simultané des Couleurs et de l'Assortiment des Objets colorés* (1839); *Théorie des Effets Optiques que présentent les Etoffes de Soie* (1846); *De la Baguette divinatoire, du Pendule, et des Tables tournantes* (1854); *Des Couleurs et de leur Application aux Arts Industriels* (1864); and a work on a new organic acid, *L'Acide Aoiqus* (1871). C. was a fellow of the Royal Society of London, and a Commander of the Legion of Honor. In 1886 the centenary of his birth was celebrated with great enthusiasm. In the same year Harvard university, on the 250th anniversary of its foundation, conferred upon him the degree of LL.D. He d. 1889.

**CHEVRON**, in heraldry, an ordinary representing the couples or rafters of a house, and supposed to betoken the accomplishment of some memorable work, or the completion of some business of importance, generally the foundation of his own family by the bearer. The C. is formed of two lines placed pyramidically, i.e., joined together at the top, and descending to the extremities of the shield in the form of a pair of compasses. *Chevronel*, a diminutive—half the size—of the chevron.

**CHEVRON**, in architecture, a molding in the form of a succession of chevrons, otherwise called a zigzag molding. In general, it is characteristic of Norman architecture, but is also found with the pointed arch, during the transition period from Norman to early English.

**CHEVRONS**, are badges consisting of stripes meeting at an angle, worn on the coat sleeves of non-commissioned officers, above the elbow on the dress coat and blouse, but below the elbow on the overcoat, the points down in all cases. The cloth chevrons are of the same color as the facings of the uniform, except those worn on the overcoat by infantry, which are of dark blue cloth. The engineers' chevrons are piped with white cloth. A corporal has two bars, a sergeant three bars, a first sergeant three bars and a lozenge. The various classified non-commissioned officers have especially distinguishing marks in addition to the bars, such as bugles, stars, crossed keys and pens, crossed hatchets, etc. All enlisted men are entitled to a diagonal half chevron for each term of enlistment, to be worn on both sleeves below the elbow. A diagonal half chevron of gold lace is also worn to indicate service in war. Service chevrons are not worn on the overcoat or blouse.

**CHEVY CHASE**, the name of perhaps the most famous of British ballads. In its present form, the piece does not seem to be older than about the beginning of the 17th century. But more ancient versions, doubtless, existed; and bishop Percy has published a poem of the 16th c., which has obviously suggested passages in the more recent composition. It is impossible to reconcile its incidents with history, but the event which is meant to be commemorated appears to have been the battle of Otterburn, in Aug., 1388—a fight which Froissart declares to have been the bravest and most chivalrous which was fought in his day. According to the ballad, Percy vowed that he would enter Scotland, and take his pleasure for three days in the woods of his rival, and slay the deer therein at will. Douglas, when he heard the vaunt, exclaimed: "Tell him he will find one day more than enough." Accordingly, at the time of the hay-harvest, Percy, with stag-hounds and archers, passed into the domains of his foe, and slew a "hundred fallow-deer and harts of grace." When the English had hastily cooked their game, and were about to retire, earl Douglas, clad in armor, and heading his Scottish spears, came on the scene. Haughty challenge and defiance passed between the potentates, and the battle joined. In the center of the fray the two leaders met: "Yield thee, Percy!" cried Douglas. "I will yield to no Scot that ever was born of woman!" cried Percy. During this colloquy, an English arrow struck Douglas to the heart. "Fight on, my merry men!" cried he, as he died. Percy, with all the chivalrous feeling of his race, took the dead man by the hand, and vowed that he would have given all his lands to save him, for a braver knight never fell by such a chance. Sir Hugh Montgomery, having seen the fall of Douglas, clapped spurs to his horse, dashed on Percy, and struck his spear through his body a long cloth-yard and more. Although the leaders on both sides had fallen, the battle, which had begun at break of day, continued till the ringing of the curfew-bell. Scotsmen and Englishmen claim the victory. When the battle ended, representatives of every noble family on either side of the border lay on the bloody greensward.

**CHEWING-GUM**. The habit of chewing gum is, perhaps, peculiar to the United States, and it has rapidly spread until it is no uncommon thing to see boys and girls passing along the streets engaged in the practice. The gum is now prepared from the sap of the Chicle, a Mexican tree similar to the india-rubber tree, and it was first imported in 1867 for the purpose of using it in india-rubber manufacture. The preparation is sweetened, and may be flavored with peppermint, licorice, tolu or other extracts. Spruce gum is also much used and many prefer it to the other.

**CHEWINK**, the popular name for the ground robin, or towhee bunting, *pipilo erythrophthalma*. It is of variegated colors, red, white, and brown, is about 7 or 8 in. long, nests on the ground, and flies with a peculiar jerky motion. It lives in thickets, and finds its sustenance in seeds and worms scratched up from leaves and grasses.

**CHEYENNE**, a co. in eastern Col., on the Kansas border, formed from parts of Elbert and Bent; 1800 sq. m.; pop. '90, 534. It is watered by Big Sandy creek and other streams. Co. seat, Cheyenne Wells.

**CHEYENNE**, a co. in n.w. Kansas; formed 1873; intersected by Republican river; 1020 sq. m.; pop. '90, 4401. Co. seat, St. Francis.

**CHEYENNE**, a co. in s.w. Nebraska, on the Colorado and Wyoming border, intersected by the n. and s. forks of the Platte; 3288 sq. m.; pop. '90, 5693. The Union Pacific railroad passes through the s. part. Co. seat, Sidney.

**CHEYENNE**, a city, capital of Wyoming, and co. seat of Laramie co.; on the Union Pacific railroad, where it is joined by the Kansas Pacific, 100 miles n. of Denver, Col. It is on a broad open plain, 6,075 ft. above tide, with streets wide and regular; contains the workshops of the Union Pacific railroad; and has lignite and iron mines in the vicinity. The main business is in receiving and distributing supplies for Indian agencies and government forts. There are, however, many manufactories, and a rapidly growing general business. The place was first settled in 1867, when the Union Pacific railroad reached that point. In 1869, a large portion of the city was destroyed by fire. It now has costly waterworks, electric lights, telephones, etc. Pop. '90, 11,690.

**CHEYENNES**, an Indian tribe of the Algonquin family, once residing on and near the Cheyenne river, a tributary of the Red River of the North. Driven away by the Sioux, they retired beyond the Missouri, and about the beginning of the century they were further driven to the Black Hills region. In 1825, the first treaty with them was made by Gen. Atkinson. Since then many treaties have been made, and almost all of them immediately broken by the whites, and constant trouble has been the result. The fearful and cold-blooded massacre of nearly a hundred men, women, and children of this tribe, led by Col. Chivington, of Colorado, in Nov., 1864, led to war that cost the U. S. government \$40,000,000, and so embittered the Indians that a permanent peace can hardly be looked for. In 1867 Gen. Hancock burned some of the villages, and began or rather continued a state of war, in the course of which Gen. Custer defeated them at Washita, where Black Kettle, a chief, and two or three dozen squaws and papooses were killed. The revenge taken upon Custer a few years later will not soon be forgotten. In '77, the Cheyennes were removed to the west part of the Indian territory where, in common with the Arapahoes, they occupy a reservation of 6,715 sq. m. They numbered, '82, about 3,600.

**CHHATISGARH**, a division of British India under the jurisdiction of the commissioner of the central provinces, comprising the districts of Raipur, Balaspur, and Sambalpur. and seven small feudatory states. Pop. '91, 3,545,000.

**CHIABRERA**, GABRIELLO, an Italian poet, b. at Savona, 8th June, 1553. He was educated at Rome under the care of his uncle, after whose death he entered the service of cardinal Cornaro, but was obliged to leave it in consequence of the revenge he had taken on an Italian nobleman who had done him an injury. In his 50th year he married, and remained independent for the rest of his life. He died 14th Oct., 1637. C.'s poetical faculty developed itself late. Having commenced to read the Greek writers at home, he conceived a great admiration of Pindar, and strove successfully to imitate him. He was not less happy in catching the naïve and pleasant spirit of Anacreon; his canzonetti being distinguished for their ease and elegance, while his *Lettere Famigliari* was the first attempt to introduce the poetical epistle into Italian literature. C. also wrote several epics, bucolics, and dramatic poems. His *Opere* appeared at Venice, in 6 vols., 1763.

**CHIANA** (in ancient times, *Clanis*), a river in Tuscany, formed by several streams from the Apennines, and falling into the Arno a few miles below Arezzo. Along with another river of the same name, which, flowing in the opposite direction, enters the Paglia at Orvieto, it waters the perfectly level Val di Chiana, which its overflow rendered once the most pestilential district of Italy. Ferdinand III. and his minister, Fossombroni, undertook extensive hydraulic works for improving the bed of the river, which they led through the lakes of Montepulciano and Chiusi, and employed for the artificial irrigation of the whole valley. The district has since become the most fruitful, perhaps, of all Italy—a perfect garden, supporting a pop. of more than 100,000.

**CHIANTI**, an Italian mountain-range in the province of Siena, clothed with olive and mulberry trees and vines. The mountain gives name to an excellent red wine grown there. This wine is now regarded as among the finest of Italian wines, being full flavored and astringent, with an alcoholic strength equal to about twenty per cent. of proof spirit.

**CHIA'PA**, or **CHIAPAS**, a state in the s.e. of the Mexican confederation, lying to the a.w. of Yucatan, and extending in lat. between 16° and 18° n., and in long. between 90° 30' and 94° west. It contains 27,222 sq. m., and (1895) 313,678 inhabitants, chiefly aborigines. Near Palenque, one of the towns of C., are some of the most extensive and magnificent ruins in Central America. Capital, San Cristobal.

**CHIARI**, a t. of Lombardy, 14 m. w. of Brescia, on the railway between that place and Milan. It is an ancient place, many Roman remains being still found here; and at one time it was strongly fortified, but its walls are now ruinous. Silk is the staple manufacture. Pop. 9,000.

**CHIAR-OSCU'RO** (Ital.), an artistic term, composed of two Italian words, the one of which signifies light, the other darkness or shadow. But C. signifies neither light nor shadow; neither is it adequately described by saying that it is the art of disposing of both the lights and shadows in a picture, so long as either is regarded apart from the other. It is rather *the art of representing light in shadow, and shadow in light*, so that the parts represented in shadow shall still have the clearness and warmth of those in light, and those in light the depth and softness of those in shadow. It is not the making of the one die softly and gradually away into the other, but the preservation of both in combination, as we constantly see it in nature, when the light is not the mere glare of the sun striking on a particular object, nor the shadow the entire absence of the influence of light. That the skillful treatment of C. is a matter of extreme difficulty, is plain enough from the very small number of artists who ever attain to it. Still it is a branch of art without the mastery of which no painting can be successful in any department. It is as indispensable in portrait-painting as in the highest departments of ideal art; and though a just and even a lofty conception of the subject may be distinctly indicated by attention to form alone, it is impossible that its realization can ever be satisfactorily accomplished by any one who has not mastered this most subtle mode of handling colors. The only mode by which a knowledge of C. can be attained, so as to apply it to practice, is by studying it as exhibited by such painters as Titian, Rubens, Rembrandt, and, above all, Correggio.

**CHIASMUS**. See SYNTAX, FIGURES OF.

**CHIAVA'RI**, a maritime t. of Piedmont, situated on the gulf of Rapallo, at the mouth of the Sturla, 21 m. e.s.e. of Genoa. The houses in general are well built, with open arcades skirting the narrow streets. C. has several fine churches, the principal of which is the *Madonna del Orto*. Numerous picturesque old towers, one of them of considerable size, are scattered over the town. Lace and silk are manufactured here; and the place is also noted for its light, handsome, cheap furniture, made chiefly of cherry-wood. The anchovy fishery is important; and in the vicinity are extensive slate-quarries. Pop. 12,000.—The old province of C., of which the above town was the capital, had an area of 155 sq. m., with a pop. of 109,000. Its surface is generally mountainous, but it has valleys of great fertility, yielding grain, grapes, olives, etc.

**CHIAVEN'NA**, a t. of Lombardy, beautifully situated in the midst of vineyards, at the junction of the valley of St. Giacomo and Val Bregaglia, 38 m. n.n.w. of Bergamo. It is overlooked by the Rhetian Alps; and its position on the Splügen road secures it

considerable traffic. Silk, cotton, and a coarse ware cut out of a soft stone found in the neighborhood, are the chief manufactures. Pop. about 5000.

**CHIBOUQUE**, or **CHIBOUK**, a tobacco pipe used in Turkey and Egypt, having a long wooden stem, often of valuable material, a mouthpiece of glass or amber, and a bowl of baked clay.

**CHIC**, in common parlance, is a word of modern English slang, but of German origin. Its derivation is *geschick*, the meaning of which is skill, address, dexterity. The term is used in painting to express the art of giving efficiency in the most dexterous manner possible, with ability and adroitness closely united. The word is also employed in connection with fashion—and spoken of in this sense, means style, manner, grace and “go.” Although of German origin, it has been received into general usage through the French—a language which fixed the present form of the word. It is also synonymous with *knack*—*Cet artiste a du chic*, means, “that artist has great facility.” Another idiom much used is, *avoir du chic*, to be “up to it,” to be a “swell.”

**CHICA**, a red feculent substance, valuable as a dye-stuff, giving an orange-red color to cotton. It is obtained by boiling the leaves of a species of *bignonia* (*b. chica*), a native of the banks of the Cassiquiare and the Orinoco. The Indians use it for painting their bodies. The *C.* plant is a climber, with abruptly bipinnate leaves, smooth heart-shaped leaflets, and flowers in pendulous axillary panicles. See **BIGNONIACEÆ**.

**CHICA**, **PITO**, **Poso**, or **MAIZE BEER**, is a fermented liquor made from maize or Indian corn. It is much used in some parts of South America, and is made in a similar manner to ordinary beer; but the Indians sometimes prepare it by chewing instead of crushing the grain; and that which is so prepared (*chica mascada*, or chewed *C.*) is most highly esteemed by them. When they wish to make this liquor particularly strong and well flavored, they have also a practice of pouring it into an earthen jar, which contains some pounds of beef; and having made the jar perfectly air-tight, they bury it several feet deep in the ground, where it is left for several years. On the birth of a child, it is their custom thus to bury a jar of *C.*, to be drunk at the same child's marriage. *C.* has an agreeable flavor, and is very strong and intoxicating.

**CHICA** (*Sp.*), a lively dance, popular in Spain and in South America as well; possibly of Moorish origin. Some etymologists would connect the word with the French *gigue*, and the Italian *giga*.

**CHICAGO**, port of entry; county seat of Cook co., Illinois; principal city of the state, and second in population in the U. S.; on the s.w. shore of lake Michigan, at the mouth of the *C.* river, and 18 m. n. of the extreme s. point of the lake; lat. 41° 53' 3" n.; long. 87° 38' w.; distant in a direct line 715 m. w. by n. of New York; 590 m. n.w. from Washington; 260 m. n.e. from St. Louis; 500 m. e. of Omaha.

The name *C.* (pronounced She-kaw-go), according to one derivation, is simply a corrupted form of the Indian She-gau-ga-wiuzhe, meaning skunk-weed or wild onion, and was given to the locality from the abundance of that plant. The site was visited by Joliet and Marquette in Sept., 1673, and in 1674 by Marquette, who spent most of the winter near by. Later, it was a halting-place for La Salle, Hennepin, and others, and on a map (Franklin's) published at Quebec, 1685, was designated as “Fort Chicagou,” a circumstance indicating the existence of a trading post. The earliest settler, other than the aborigines, was Baptiste Point De Saible, a mulatto from San Domingo, who resided there from 1790 on for a few years, disposing of his pre-emptive claim to one Le Mai, a French fur trader who, in 1804, sold out to John Kinzie, the first permanent white American settler. In 1804 the U. S. built Fort Dearborn at this point. In 1812 orders were sent to abandon it, and the evacuation occurred Aug. 15, but the troops were massacred on the march by their Indian escort, and on Aug. 16 the fort was burned. It was rebuilt in 1816, and garrisoned until 1837. In 1830 the settlement comprised about  $\frac{1}{4}$  sq. m., and had a civilian population not exceeding 100. By 1833, this had increased to 350, and on Aug. 10 the town, then spread over 560 acres, was organized. On Feb. 10, 1835, a special charter was granted, describing the area of *C.* as including 2 whole sections and 3 fractional sections of land. In that year (Nov. 26), the first newspaper was issued. In 1837, Mar. 4, *C.* was incorporated, and on May 2 the first election was held, when 700 votes were cast.

The great fire of Oct. 8-9, 1871, raged two days and nights, burning over an area of 2100 acres, and destroying more than 17,000 buildings, including the principal stores, many private residences, 32 hotels, 41 churches, 10 theaters and halls, and all the national banks but one. The total loss was estimated at \$190,000,000, and of this a little more than \$40,000,000 was recovered on insurance. Not less than \$7,000,000 were contributed in this country and in Europe to aid the sufferers, over 98,000 of whom lost their homes. The recovery of the city was rapid, and within three years' time few traces of the disaster could be seen. In July, 1874, another fire laid waste a large portion of the city. On May 4, 1886, an anarchist riot occurred in which 6 police officers were killed and several wounded. Eight persons were convicted and 4 were hung. In 1890 Congress fixed upon Chicago as the site for the World's Fair in 1893, commemorating the discovery of America.

The city's territory, prior to July, 1889, was 47 sq. m. In that month 127 sq. m. were added, including the towns of Jefferson and Lake, and the village of Hyde Park, making a total area of 174 sq. m., which was subsequently increased to 189 sq. m.

C. extends along the lake about 24 m., and westward, 6-11 m. Although it is 593 ft. above the sea, it originally stood on a low, flat prairie from 8-10 ft. above the lake. The grade of a large portion was raised, block after block of stores, hotels, etc., being lifted to the required level. Its grade is now 14 ft. above the lake on the e. side, and 28 ft. at the w. extremity. The shore at the mouth of the Chicago presents an even line extending nearly due n. and s. A portion of the n. shore is protected by a massive wall. The city is divided into 3 sections, popularly called the n., s., and w. divisions by the sluggish C. river and its two branches, one of which runs from n. to s., and the other from s. to n. The junction occurs about  $\frac{1}{2}$  m. from the lake, and from here the course of the river is due e. The stream, with its branches, is navigable for about 4 m. from its mouth, and the entire river frontage, including docks, is 41 m. Two tunnels under the river, used by cable cars and pedestrians, connect the n. and s., and s. and w. divisions, respectively. The mouth of the river, formerly a sluggish bayou, has been deepened by piers that extend into the lake on either side, giving an entrance way about 500 ft. wide; and long breakwaters on the e. and s.e., constructed by the U. S. government, form an outer harbor, with an average depth of 16 ft., and an area of about 455 acres. Additional protection to vessels is given by an exterior breakwater, 5436 ft. long, that extends in a n.e. direction about a m. n.e. of the river's mouth. The shore end of the north pier has a lighthouse and the lake end a beacon light. There is also a beacon light on the s. end of the easterly breakwater. At South Chicago, at the northern mouth of Calumet river, is another harbor 800 ft. wide between piers. The water communications are of vast extent, embracing the whole chain of northern lakes, with their 8000 m. of coast-line. Steamboats and sailing-vessels of the largest class are employed in commerce with lake Superior, bringing down vast stores of iron and copper ore from that region; while through the Welland canal (around Niagara falls) connecting lake Erie with lake Ontario, vessels loaded at C. pass eastward to Montreal, where connection is made with steamships for Europe. The Erie canal through New York is also a commercial highway for C. to the ports of the Atlantic seaboard. The Illinois and Michigan canal for boats of 140 tons, was constructed 1836-48, and gives communication with the Mississippi and its affluents during 9 months of the year. This extends to La Salle, the head of navigation on the Illinois; is 96 m. in length, and at its highest level was originally 12 ft. above the lake, but in 1866-70 the city deepened it, and it is now 8 $\frac{1}{2}$  ft. below the ordinary level of the lake. The river channel was also deepened, so that the lake no longer receives its waters, but itself furnishes a clear stream, flowing the other way, giving improved navigation and carrying off the sewage of the city toward the Illinois at the rate of a mile an hour. One of the greatest engineering and sanitary works of the country is the drainage channel and waterway, begun in 1891, and to be completed in 1897, at an estimated cost of \$30,000,000. It will be 30 miles long, and was planned with a view of having it converted into a ship canal ultimately.

**RAILROADS.**—The water channels are not more important than the network of railroads by which Chicago is put into rapid communication with all parts of the union.

There are fifty-three railroad lines and branches, operating 83,500 miles, converging in and tributary to Chicago and connecting it with every state, Canada and Mexico. Among the roads directly connected are the Chicago and Alton; Chicago, Milwaukee and St. Paul; Chicago and Central Illinois; Chicago, Burlington and Quincy; Chicago and Eastern Illinois; Chicago and Northwestern; Chicago and Atlantic; Chicago and Grand Trunk; Chicago, Rock Island and Pacific; Pittsburg, Fort Wayne and Chicago; Illinois Central; Michigan Central; Baltimore and Ohio; Lake Shore and Michigan Southern; Pittsburg, Cincinnati and St. Louis; Wabash, St. Louis and Pacific. By means of a "belt line," freight is transferred from one road to another without delay.

**STREETS AND PARKS.**—The streets cross at right angles, are generally 80 ft. wide, while some are 6-9 m. long. There are over 2500 miles of streets and alleys. The scarcity of stone has led to the use in some sections of wood, cinders, and gravel. The main aves. are parallel with the lake. Of these, Michigan, Washington, Dearborn, Prairie, Calumet, and La Salle are conspicuous for their elegant mansions. The river and canal are spanned by fifty-four bridges, and there are also thirty-nine viaducts over railroad tracks. There are several street railroad lines covering the city and suburbs, and an elevated railroad opened in 1895; the street railroads are principally electric and cable lines. Many of the streets are lighted by the electric light underground system, and the total cost of lighting the streets and parks is nearly \$1,000,000 per annum.

The public parks have a total area exceeding 2500 acres. The larger of these are connected by boulevards 250 ft. wide, extending around the city and forming a continuous drive of more than 30 m. Lincoln park (310 acres) is in the n. division. To the s.w. lie Humboldt park (200 acres) and Garfield park (185 acres). Within the limits of the latter is the Jockey driving park; s.e. of Garfield is Douglas park (179 acres), and still farther to the s.e. are the South parks: Jackson, Washington, Gage, and Midway Plaisance (aggregating 1057 acres). Besides these principal parks the city is possessed of eight smaller squares known as Lake, Ellis, Campbell, and Holstein parks, and







Aldine, Bleekerlike, Washington, and Douglas Monument Squares. The Lake Front park contains 20 acres. Among notable public monuments are the statues of Lincoln and Humboldt, in the parks named after them, the mausoleum and statue of Stephen A. Douglas in Douglas Monument square, the equestrian statue of Gen. Grant in Lincoln park, the equestrian statue of Gen. Logan in Lake Front park, and the Confederate monument in Oakwood Cemetery dedicated in 1895. There are numerous cemeteries, the largest being Graceland and Rose Hill. Within the city limits are three lakes: Calumet, with an area of 3123 acres, Hyde lake and part of Wolf lake.

**BUILDINGS.**—Owing to the concentration of business in a limited area, Chicago has become celebrated for its mammoth buildings, called "sky-scrapers," erected on the steel-frame system; but by a strict city ordinance, the height of buildings is limited to 150 feet. The centre of the business quarter is the Court House and City Hall, a magnificent twin building of limestone, with granite columns in French Renaissance style. It fills an entire square, and cost nearly \$5,000,000. The east half is used for county purposes and the west half by the city. In the space between the buildings is the Drake fountain, erected in 1892, with a bronze statue of Columbus. La Salle street, running south from the City Hall, contains some of the finest office buildings. The most prominent are the Chamber of Commerce, one of the finest commercial structures in the world, costing more than \$1,000,000, fourteen stories high, the great central court roofed by the largest skylight in the world, and the interior richly furnished, with marble wainscoting and mosaic floors; the Tacoma building; the Temperance Temple, a combination of Gothic and French architecture, thirteen stories high, costing \$1,100,000. It consists of two great wings united by a narrow middle portion, resembling the letter H. From the roof springs a bronze spire 70 feet high, surmounted by a female figure. The Home Insurance Building is eleven stories high, with a superb entrance, and an interior decorated with beautiful marbles. The Rookery, a Romanesque building of granite, brick and terra cotta, eleven stories high, contains 600 offices elaborately finished, and cost \$1,500,000. The Board of Trade, at the foot of La Salle Street, is an enormous granite building, with a tower 332 feet high, giving a magnificent view. The Exchange Hall is 174 feet long by 155 feet wide. Nearly opposite is the Royal Insurance Company, an Ionic building, with a beautiful facade elaborately carved. To the east on Jackson Street is the Custom House and Post Office, occupying an entire block. In this vicinity are five great buildings, sixteen stories high: the Great Northern Hotel, the Manon, the Fair Building, the Manhattan, and the Monadnock-Kearsage, costing \$3,000,000, built entirely of steel, and finished in granite and marble. Next to the last is the Union League Club, the most sumptuous club-house in Chicago. North of the Custom House is the Rand & McNally Building, one of the largest and finest publishing houses in the world. On the same street is the wholesale establishment of Marshall, Field & Company, designed by Richardson. At the corner of Monroe and South Clark Streets is the First National Bank, containing the largest banking room in the world. On Michigan Avenue and Congress Street is the Auditorium, the most magnificent building in Chicago, erected in 1887-89 at a cost of \$3,500,000. It includes a large hotel facing the Lake, and one of the most beautiful theatres in the world. The longest front of the building is 360 feet, and the height of the main building is 145 feet. The tower, commanding a magnificent view, is 270 feet high. Part of it is occupied by the United States Signal Service. The main entrance, on Congress Street, leads to a beautiful court, with an elaborate mosaic floor, and decorated with marble, bronze, stained glass and gold. The grand staircase of marble and bronze is one of the finest in the United States. The theatre, which will seat 4100 persons, is luxuriously furnished and decorated with beautiful mural paintings. The stage is most completely equipped, and comprises 6862 square feet. The magnificent Studebaker Building, adjoining the Auditorium on Michigan Avenue, is one of the show buildings of Chicago. North of it is the beautiful Romanesque Chicago Club House. Two blocks above, on the Lake Front, is the beautiful new building of the Art Institute, 320 feet long and 208 feet wide, containing valuable collections, picture galleries, a library and a lecture-hall. At the end of Michigan Avenue, at the Chicago River, is the site of Fort Dearborn, marked by a tablet. On State Street, north of Madison, is the Spanish Renaissance Columbus Building, completed in 1893, at a cost of \$800,000. It is fourteen stories high, with a tower 240 feet high, tipped with a globe of opalescent glass lighted with a powerful electric light. Over the entrance is a bronze statue of Columbus, and in the interior are two glass mosaics, representing scenes in his life. On the opposite corner is Marshall Field's retail store, in the centre of the shopping district. Adjoining it is Central Music Hall, and on the corner above is the Masonic Temple, said to be one of the finest buildings in the world. It has twenty-one stories, and its height is 265 feet. Seventeen floors are devoted to business, and the remainder, used by the Masons, is magnificently finished. Diagonally opposite is Unity Building, sixteen stories high, costing \$1,000,000. One block west is the stately Schiller Building, seventeen stories high, containing the German Theatre, halls, club rooms and offices. Near it is the new Ashland Block, sixteen stories high, built in classic style. The finest residence streets are Michigan and Drexel Boulevards, Lake Shore Drive, Prairie Avenue and Grand Boulevard.

**EDUCATION.**—The number of public school buildings is 253, valued at \$15,570,000. In 1896 the number of scholars enrolled was 201,380, with 4,063 teachers. The private

school enrollment was 78,171. The higher educational institutions are the new University of Chicago, opened in 1892, with an endowment of \$7,000,000, \$3,600,000 of which was given by Mr. Rockefeller; the Northwestern University at Evanston; the Chicago (Cong.), McCormick (Presb.), Western (Prot. Epis.), and Baptist theological seminaries; St. Xavier's Academy; and St. Ignatius College. There are eight medical schools, the most prominent of which are the College of Physicians and Surgeons, the Rush, the Homœopathic, and the Bennet; the Union College of Law; five dental colleges; two colleges of pharmacy; two training schools for nurses, and the Chicago Veterinary college. There are eight art schools and thirteen schools of music; two manual training schools, the Armour institute, similar in scope to the Pratt and Drexel institutes, and endowed by its founder with \$1,400,000; and Lewis Institute, a projected technical school endowed with \$1,000,000. The Academy of Sciences and the Historical Society lost their most valuable collections in the great fire. The latter lost 100,000 books, some valuable paintings, and the original draft of the Emancipation Proclamation.

**LIBRARIES.** — Chicago has three great libraries, and a fourth in store. The Public library, founded in 1882, has the largest circulation of any library in the country, and has occupied quarters in the Court house preceding the completion of a magnificent building on Michigan Avenue, estimated cost, \$1,500,000. The Newberry Library is a reference library containing the finest musical library in the country, and has an endowment of \$3,000,000. The handsome new building, which has cost about \$1,000,000, has a capacity for one million volumes, and will eventually cover the entire square, giving accommodation for three millions of books. The Library of the University of Chicago ranks already second among colleges. A fourth great library, to be erected on the south side is the Crerar, endowed with \$2,500,000. The library of the Chicago Law Institute in the County building is large and valuable.

**THEATRES, CLUBS, HOTELS.** — There are numerous first-class theatres and places of amusement in Chicago. The leading theatres are the Auditorium, with 7,000 seats; the Alhambra, Moorish in design and one of the most beautiful in the city, with a seating capacity of 2500; the Chicago opera house, capacity 2300; the Columbia, capacity 2400; the German theatre; Grand Opera; Havlin's; Hooley's; the Haymarket, McVickar's, rebuilt in 1891, and the Great Northern, opened in 1896; Jacob's academy of music and Central music hall are used for concerts and lectures. The Libby Prison museum contains the original prison.

The leading clubs are the Athletic, Calumet, Chicago, Illinois, Iroquois, La Salle, Marquette, Standard, Union, Union League, and the Chicago Woman's Club. The Calumet, Standard and Union League have magnificent club houses. There are in Chicago nearly 6000 societies.

There are about 750 hotels. The most prominent are the Auditorium; with a large annex, Congress hall, opened 1893; the Richelleu; Great Northern; Metropole; Granada; Palmer house; Grand Pacific; Hampden; Wellington; Lexington; Virginia; Leland, and the Imperial.

**CHURCHES.** — There are nearly 700 churches in Chicago. The most prominent architecturally are the Roman Catholic Cathedral of the Holy Name, an ornate Gothic structure; the Jesuit Church, with a very rich and beautiful interior; the Episcopal Cathedral of St. Peter and St. Paul; St. James's; Grace and Trinity; Immanuel Baptist; Second and Third Presbyterian; Plymouth; St. Paul's, Universalist; Centenary, Methodist; Unity, and the Church of the Messiah, Unitarian.

**HOSPITALS AND INSTITUTIONS.** — The city contains a large number of hospitals, the largest being the Cook County hospital; the Presbyterian; the United States marine hospital, the largest of its kind in the country; St. Luke's and St. Joseph's hospitals; the Women's hospital, and the hospital of the Alexian Brothers. There are many dispensaries, asylums, and homes, day nurseries, reformatories, and relief societies. One of the most interesting charities is the Armour mission, a memorial to Mr. Joseph Armour, including a mission hall, crèche, library, kindergarten, and dispensary.

**COMMERCE.** — The commerce of Chicago ranks next to that of New York in extent and variety. Chicago is the largest grain port in the world, the capacity of its grain elevators being over 80,075,000 bushels. The grain fleet of 1896 comprised 121 steamers and 69 schooners and barges, of an aggregate capacity of 13,202,000 bushels. It was the largest fleet ever assembled here, and represented a capital investment of over \$20,000,000. The live-stock and lumber interests in their order follow grain in importance. The foreign trade in merchandise in the calendar year 1896 was — imports, \$12,117,115, and exports, \$2,509,124. The city also has an enormous domestic trade by railroad.

**MANUFACTURES.** — In 1890 the number of manufactories was 9,977 with \$359,739,598 capital, employing 210,366 persons, to whom \$19,885,079 was paid in wages, and with products valued at \$664,567,923. The chief articles manufactured are iron and steel, agricultural implements, railroad cars, textiles, beer and spirits, leather and meat products. Among the great establishments are the *Illinois Steel Company*, with the largest rolling mills in the world, and a capital of \$50,000,000; the *McCormick Harvesting Machine Company*, producing 120,000 machines yearly, and the *Grant Locomotive Works*. Chicago is famous for its stock yards and meat-packing establishments. The Union stock yards cover 400 acres and can accommodate at one time over 200,000 animals. The slaughtering and meat-packing industry was the most important in 1890 in the value of its products. The capital investment was \$39,222,195, and the value of all products was \$203,006,402.



For places outside of territory covered by this map see general map of Chicago.

**PROMINENT INSTITUTIONS AND BUILDINGS.**

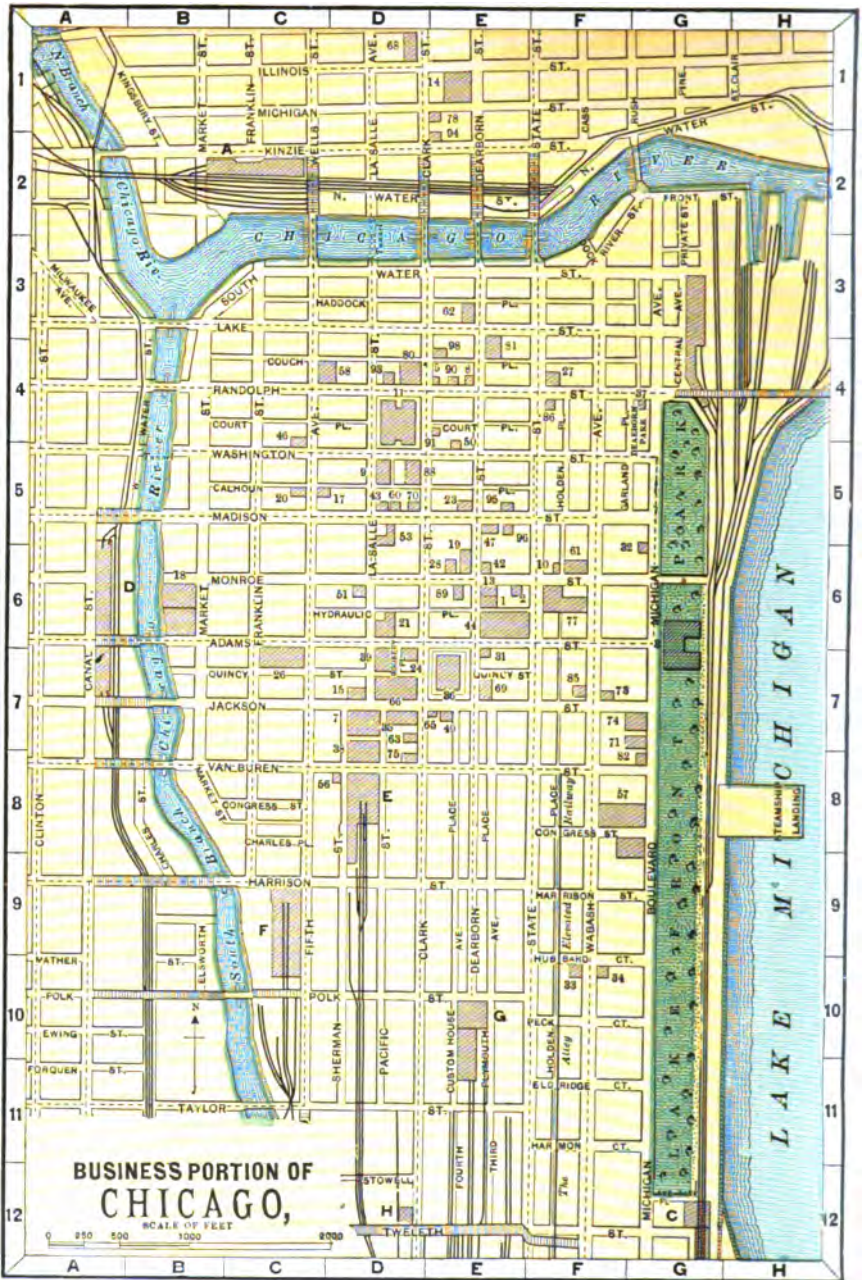
1. Adams Exp. Bldg. E6
2. American Ex. Co. E6
3. Art Institute. G6
5. Ashland Block. E4
7. Board of Trade D7
8. Borden Block. E4
9. Chamber of Com. D8
10. Chicago Club. F8
11. City Hall. D4
13. Com. Nt. Bk. Bldg. E6
14. County Jail. E1
15. Counselman Bldg. D7
17. Daily News. D5
18. Farwell Building. B6
19. First Nt. Bk. Bldg. E6
20. Herald Building. C3
21. Home Ins. Bldg. D6
23. Inter-Ocean Bldg. E5
24. Lakeside Bldg. D.
26. Marshall, Field & Co.'s Building. C7
27. Masonic Temple. F4
28. Montauk Block. E6
31. Owings Building. E7
32. Panorama Chicago Fire. G6
33. Panorama Battle of Gettysburg. F10
34. Panorama Niagara Falls. F10
35. Phoenix Building. D7
36. Post-Office. E7
37. Public Library. G4
38. Rialto Building. D7
39. Rookery Building. D7
42. Stock Exchange. E6
43. Tacoma Building. D5
44. The Fair. E8
46. Times Building. C4
47. Tribune Building. E5
49. Union League Clb. E7
50. U. S. Express. E3
51. Woman's Christ'n Tem. U. Temple. D6
53. Y. M. C. A. Bldg. D6

**HOTELS.**

56. Atlantic Hotel. D8
57. Auditorium Hotel and Annex. F8
58. Briggs House. D5
59. Brevoort House. D4
61. Clifton House. F8
62. Commercial Hotel. E3
63. Gore's Hotel. D7
65. Grace Hotel. E7
66. Grand Pacific. D7
68. Grand Palace. D1
69. Great Northern. E7
70. Hotel Chicago. D5
71. Hotel Richelleu. F7
73. Hotel Wellington. F7
74. Leland Hotel. F7
75. McCoy's Hotel. D8
77. Palmer House. E6
78. Revere House. E1
80. Sherman House. D4
81. Tremont House. E4
82. Victoria Hotel. F8

**THEATERS.**

57. Auditorium. F8
86. Cent'l Music Hall. F4
89. Chicago Op. Hou. D5
89. Columbia Theatre. E6
90. German Theater. E4
91. Grand Op. House. E5
93. Hooley's Theater. D4
94. H. R. Jacobs' N. Clark-St. Theatre. E2
95. Madison-St. Theatre. E5
96. McVicker's Theatre. E1
98. Olympic Theater. E4

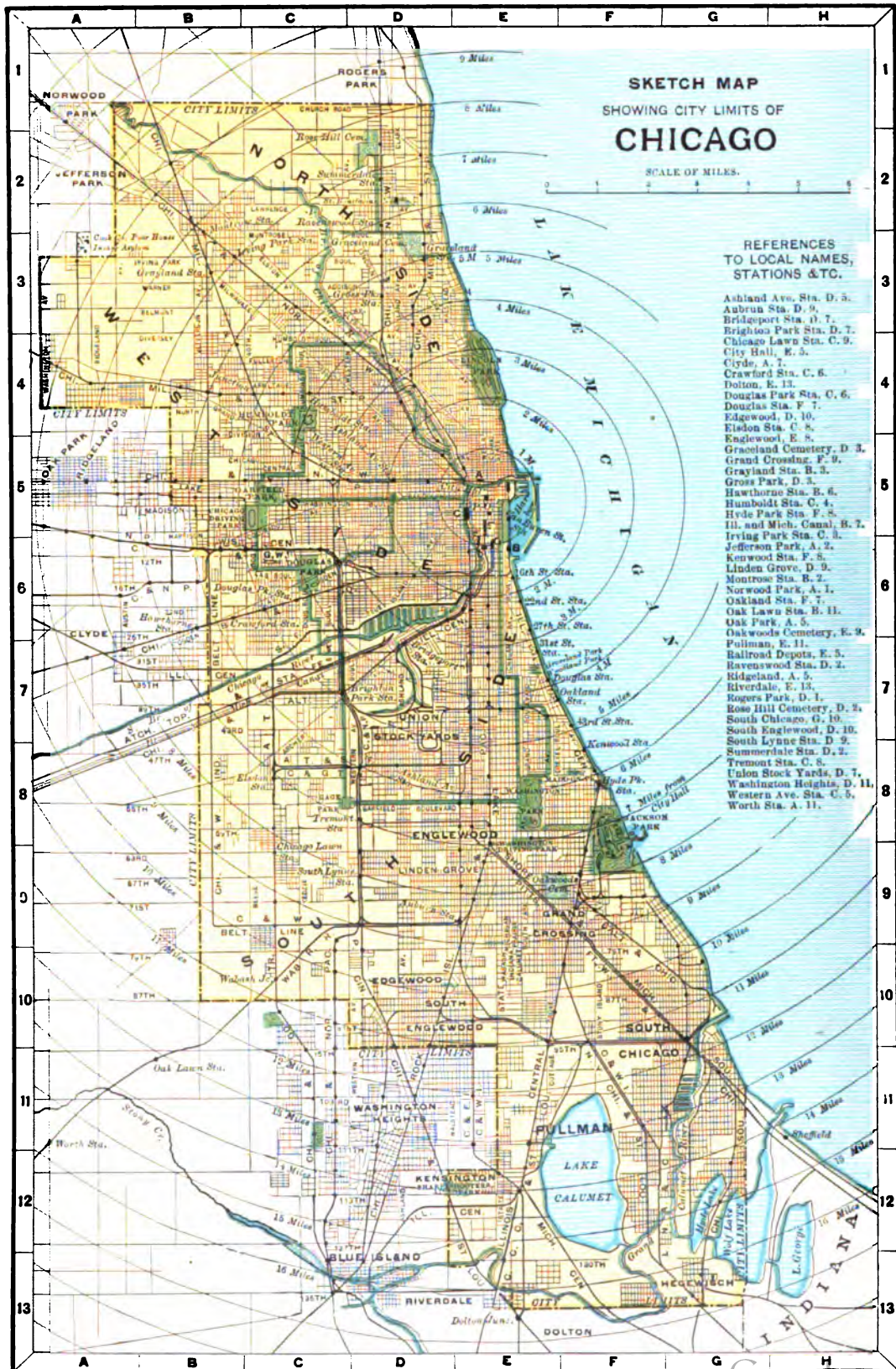


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**RAILROAD DEPOTS IN CHICAGO.**

A. Chicago & Northwestern.....C2		
C. Cleveland, Cincinnati, Chic. & St. Louis	G12	
Michigan Central (C. & W. M.).....		
D. Chicago & Alton .....		
Chicago, Burlington & Quincy.....		
Chicago, Milwaukee & St. Paul.....		
Pittsburg, Cincinnati, Chic. & St. Louis	A6	
Pittsburg, Fort Wayne & Chicago.....		
Chicago, Rock Island & Pacific.....		
E. Lake Shore & Michigan Southern.....D8		
F. Chicago & Northern Pacific .....		
Baltimore & Ohio.....		
Chicago Great Western .....		
Wisconsin Central (Northern Pacific).....		
G. Atchison, Topeka & Santa Fé.....		
Chicago & Eastern Illinois .....		
Chicago & Grand Trunk .....		
Chicago & Western Indiana.....		
Erie Railway .....		
Louisville, New Albany & Chicago.....		
Wabash.....		
H. New York, Chicago & St. Louis.....D13		







**BANKS.**—There were reported in 1895, 21 national banks with a combined capital of \$20,900,000; 9 state banks, capital, \$3,497,000; 10 loan and trust companies, capital, \$8,300,000; 2 branch Canadian banks; and 14 private banks. The exchanges at the U. S. clearing-house in the year ending Sept. 30, 1896, aggregated \$4,538,506,983.

**GOVERNMENT, ETC.**—The government is vested in a mayor, elected for two years, and a city council of two from each ward. The judiciary consists of the United States Court of Claims; Circuit and District Courts, the Appellate Court of the First District of Illinois; the Circuit, Superior, Probate, Criminal and County Courts of Cook County and ten police courts.

The police force consists of over 3200 officers and men, and costs about \$3,500,000 annually, and the fire department has over 1200 officers and men, and costs about \$1,550,000 per annum. The annual cost of maintaining the public schools is nearly \$7,000,000, and that of the entire city government nearly \$17,000,000. The city tax rate averages \$4.76 per \$100.

**WATERWORKS.**—Water is supplied from Lake Michigan by means of cribs 2-4 miles from shore, and five tunnels under the lake, leading to separate pumping works on shore. At one there are four double and two single engines, supplying 50,000,000 gallons daily, and at the other four engines supplying 61,000,000 gallons. The total capacity of the entire plant is 354,000,000 gallons; the average daily consumption is 252,000,000 gallons; and the system has over 1600 miles of distributing mains.

**FINANCES.**—The assessed valuation of property in Chicago in 1895 was \$243,476,825; real estate, \$192,498,842; personal property, \$36,850,200; railroad property, \$14,127,788. The total bonded debt of the city on July 1, 1896, was \$17,078,960; sinking funds, \$1,216,852; net debt, \$15,862,098. The city owned its water works, which cost \$21,888,245, an electric light system, and other property, valued in all at \$58,294,257.

**MILITARY.**—Chicago is the headquarters of the Military Department of the Missouri, Gen. Wesley Merritt commanding. The militia consists of the First and Second Regiments of the First Brigade of the Illinois National Guard, about 1600 men, Cavalry Troop A, 63 men and a battery of artillery. There are in addition three independent military organizations—the Chicago Hussars, Chicago Zouaves and Chicago Lancers.

**POPULATION.**—The population in 1837 (first census) was 4170; 1850, 28,269; 1860, 112,172; 1880, 503,188—204,859 foreign born, including 75,208 from Germany, 62,974 from Great Britain and Ireland. By the annexation, 1889, of Lake View, Hyde Park and other suburbs, the population was increased to 1,066,000. Total population 1890, 1,099,850. See *History of Chicago*, by A. S. Andreas (3 vols., 1670-1884, c. 1884); *History of Chicago* from 1833-1892, by C. Clearer (1892); *The Story of Chicago*, by J. Kirkland (1892).

**CHICAGO, UNIVERSITY OF**, was founded in 1889 when the first subscription was made by John D. Rockefeller. Between that time and 1897 contributions and subscriptions have aggregated \$11,500,000, of which \$7,426,000 have come from Mr. Rockefeller. The University is situated in the south division of Chicago, between Jackson and Washington parks, fronting on the Midway Plaisance. On its grounds, which contain about 24 acres, with the prospect of enlargement at an early date, are 13 buildings costing about \$1,800,000, and at Geneva Lake, Wis., the University owns 55 acres of land on which the Yerkes Observatory stands. The University consists of the graduate schools; divinity school; the colleges; the academy; the University Extension; the University libraries; laboratories; museums; the University Press; and the University affiliations. In the arrangement of the undergraduate work, the University has adopted the new plan of dividing the students into two systems of colleges—the senior colleges, which include the two upper classes of the ordinary college, and the junior colleges, which include the lower classes. The academy is located at Morgan Park, about 8 miles from the University, occupies 10 acres of ground, has four buildings, and an attendance of over 200 students. In the work of extension, the University has made great progress, giving courses of lectures in many cities and villages at a distance. It is estimated that more than 25,000 people attend these lectures each year. The University Press prints the journals, books and pamphlets of the University, including among others, the *Biblical World*, the *Journal of Political Economy*, the *Journal of Geology*, and the *American Journal of Sociology*. The libraries are extensive and annually increasing. The University enters into terms of affiliation with colleges and academies by which it seeks to confer advantages on them, and to receive benefit from them. It has another peculiar feature in that it continues throughout the entire year, which is divided into four quarters of twelve weeks each, with a vacation of one week between quarters. The summer session is attended largely by teachers in high schools and academies, and professors in colleges and universities. The University is co-educational and gives the same advantages to women students as to men. Fellowships and scholarships provide for the gratuitous tuition of two or three hundred students. In 1896-7 the number of students enrolled was 2,000, and the teaching force numbered 180. Professor William Rainey Harper, of Yale, was elected first president of the University and the actual instruction began in the colleges, graduate schools, and divinity school in Oct. 1892.

**CHICK'ESTER**, a municipal and parliamentary borough and episcopal city in Sussex, 17½ m. e.n.e. of Portsmouth. It stands on a plain between an arm of the sea and the South Downs, which rise gently on the north. It is well built, and has wide streets. The two main streets cross at right angles, and meet in an elaborately worked eight-sided



cross. Within the suburbs the city is surrounded by an ancient wall, 1½ m. in circuit, with some semicircular bastions, and now a promenade under the shade of elms. The cathedral, erected in the 12th and 18th centuries, on the site of a wooden one founded 1108, and burned 1114, measures 410 by 91 ft., with a spire 271 ft. high. The aisles are double—a mode of construction to be seen nowhere else in Britain. The cathedral has a rich choir, and portraits of the English sovereigns from the conquest to George I., and of the bishops down to the reformation. The chief trade is in agricultural produce, and live-stock. There are malting, brewing, and tanning establishments. Pop. '91, 7,842. C. returns one member to parliament. The harbor, 2 m. to the s.w. of the city, is a deep inlet of the English channel, of about 8 sq. m.; has several creeks and Thorny Isle; and is connected with C. by a canal. C. was the Roman *Regnum*, and has afforded Roman remains—as a mosaic pavement, coins, urns, and an inscription of the dedication of a temple to Neptune and Minerva. C. was taken and partly destroyed, in 491, by the South Saxons. It was soon after rebuilt by Cissa, their king, and called Cissan-caster, or Cissa's camp. It was for some time the capital of the kingdom of Sussex. In 1642, the royalists of C. surrendered to the parliamentarians, after a siege of ten days.

**CHICKADEE**, *Parus atricapillus*, is distinct from the European blackcap. It is about 5½ in. long, and 8 in. in spread of wings. Head and neck, and a patch on the throat, black; other plumage, ash-gray and brown; tail edged with white, and a white bar on the wings. Where it has not been driven away by the English sparrow, it destroys great numbers of canker worms and other caterpillars. It is a very lively, sociable, and useful bird. See *ILLUS.*, LARKS, ETC., vol. VIII. See *TIT*.

**CHICKAHOMINY**, a river in Virginia, rising n.w. of Richmond and running e. between the James and the Pamunkey to the w. line of James City co., where it turns abruptly s., and after a course of about 10 m., joins the James. The surrounding country e. of Richmond is level, and in one section there is a large swamp. On and near the C. in the early years of the civil war occurred many of the most important military movements, skirmishes, and battles—here mentioned in the order of time. In 1862, the peninsular campaign on the part of the union army began with the siege of Yorktown, the objective point being Richmond, to reach which it was necessary that the C. should be crossed. McClellan, on the union side, had 118,000 men when the siege was begun, April 5. On the other side, the confederates had 15,000 men in Yorktown, and about 50,000 more scattered over n. Virginia, all under Gen. Joseph E. Johnston. The 6th of May was the day for opening fire upon Yorktown, but on the 4th Johnston left the place, taking guns, baggage, etc., and retreated towards Richmond. On the 5th he was assailed by Hooker; and Longstreet, who commanded the rear of the confederates, turned on the defensive just as he had passed Williamsburg. He was met by Hancock's division, and was compelled to abandon his works after a sharp fight; but Longstreet held his position long enough to secure the confederate trains from pursuit. This was the battle of Williamsburg. The union loss was 1856 killed and wounded, and 372 missing. The confederate loss was about the same. On the 27th of May occurred the battle of Hanover Court-House, in which the union loss was 53 killed and 344 wounded and missing. The confederate loss must have been much greater, for McClellan's report says there were about 200 of their dead buried by his troops, and 730 prisoners were sent to the rear. The confederates had now concentrated in and around Richmond, where they had 67,000 men. The next fight on the C. was the battle of the Seven Pines, or of Fair Oaks, which took place on the 31st of May, and resulted in a substantial union victory. The confederate leader, Gen. Johnston, was severely wounded, and their losses were very heavy, but, as in most cases, no trustworthy report was made of the numbers. The union army lost 890 killed, 3,627 wounded, and 1222 missing. It is well known that the confederates felt this to be a disastrous defeat, and in common with the people of the northern states, they expected that the next move would be the capture of Richmond; but, for reasons concerning which it is to be said only that they were never explained to the general satisfaction of the people in the northern states, McClellan made no demonstration, and soon the almost defenseless city was powerfully fortified under the direction of Gen. Robert E. Lee, who had superseded Johnston in the confederate command. The fourth of the contests of the C. was the battle of Mechanicsville, June 26, and was not important in results. The confederates made several attacks upon two union brigades, but finally abandoned the work after losing about 1600 men; federal loss, 800. A more important action which occurred June 27, is known as the battle of Cold Harbor, or Gaines' Mill; the confederates call it the battle of the Chickahominy. Their loss was about 9,500; the union loss, 4,000 killed and wounded, and 2,000 prisoners. The sixth conflict in the neighborhood of the C. is known as the battle of Savage's Station, June 30, and was not an important affair. The losses were: union, 600; confederate reported at 400. The next was the battle of Frazier's Farm, also June 30, in which there was some sharp fighting, resulting in a union loss of 800 killed and 1500 wounded; and on the other side, 325 killed and 1700 wounded. The battle of Malvern Hill occurred July 1, and involved a union loss of 375 killed and 1800 wounded; and of confederates, 900 killed and 8,500 wounded. All these engagements from June 26 to July 1 cost the federals 1582 killed and 7,709 wounded; and the confederates 8,150 killed and 15,255 wounded. Including prisoners and missing, the totals of loss were—

union, 15,429; confederate, 19,405. The object, on the part of the confederates, was to relieve Richmond from the threatened siege and capture; and they succeeded. Near the end of the summer the union armies were withdrawn and combined to form the army of the Potomac. But nearly two years later there occurred one more (the second) battle of Cold Harbor, when Grant had command. The fight took place June 3, 1864, and was substantially a check of the union advance. The federal losses were about 7,000 in all; the losses on the other side were said to be only half as many. It was a little before this that Grant sent to Washington the dispatch: "I propose to fight it out on this line if it takes all summer."

**CHICKAMAUGA, BATTLE OF**, Sept. 19-20, 1863, between the union army of the Cumberland, led by Gen. Rosecranz, and the confederate forces led by Gens. Bragg and Longstreet. The forces on the union side numbered about 55,000, a quarter of whom were not engaged; the losses were 1644 killed, 9,263 wounded, and 4,948 prisoners; total, 15,854. The confederate reports embrace but two thirds of their army, and show 1894 killed, 8,974 wounded, and 883 missing; total, 11,250. A few days after the battle Gen. Rosecranz was relieved, and Gen. Grant placed in command. The battle was credited as a victory for the confederates, though no substantial advantage was gained by them. The battlefield has been converted into a National Military Park.

**CHICKAREE**, a popular name for the red squirrel, *sciurus Hudsonius*. It abounds in the southern and middle Atlantic states, and is esteemed for the tenderness and flavor of its flesh. It is not so gentle or so easily tamed as the gray squirrel.

**CHICKASAW**, a co. in n.e. Iowa, on the Wapsipinicon river and its tributaries, reached by the Chicago, Milwaukee, and St. Paul, and the Illinois Central railroads; 504 sq. m.; pop. '90, 15,019. The surface is prairie and woodland, and the soil fertile; agriculture is the chief business. Co. seat, New Hampton.

**CHICKASAW**, a co. in n.e. Mississippi, on the head waters and tributaries of the Tombigbee river, and touched by the Mobile and Ohio railroad; 520 sq. m.; pop. '90, 19,891, inclu. colored. The county is a part of the territory ceded by the Chickasaw Indians. It has a level surface and fertile soil, producing corn, cotton, etc. Co. seat, Houston.

**CHICKASAW BLUFFS, BATTLE OF**, Dec. 29, 1863. The siege of Vicksburg being in progress, Gen. Sherman (union) was ordered to make an attack in the rear, and for that purpose sent a force up Yazoo river to land above the city and approach it from the north. In this march they came upon a bayou held by a confederate force strongly intrenched. Several attempts were made to force a passage, but without success. The union loss was 192 killed, and 983 wounded. That of the other side was very small.

**CHICKASAWS**, a nation of Indians occupying a section of the Indian territory, embracing 7,267 sq. m. on the left bank of the Red River. According to their traditions and the evidence of philology, they are closely connected with the Creeks and Choctaws; and they believe that they emigrated with those tribes from the west, crossed the Mississippi, and settled in the district now forming the n.e. part of the state of Mississippi. Here De Soto visited them in 1540. From the first they were hostile to the French, and were frequently at war with them; but with the English they were generally friendly. In 1786, they made a treaty with the United States, and in 1793, they aided the whites in the war against the Creek Indians. In the early years of the present century, part of their territory was ceded for certain annuities, and a portion of the tribe migrated to Arkansas; and in 1832-34, the remainder, about 8,600 in number, surrendered to the federal government the 6,642,000 acres of which they were still the owners, and entered into a treaty with the Choctaws for incorporation into that tribe. This union was afterwards dissolved and by paying the Choctaws \$150,000 they secured full possession of their present territory. In the civil war they assisted the confederates, but their rights were restored by the Union government in 1866. The next year they surrendered 7,000,000 acres of land at 4½ cents per acre, the money (\$300,000) to go to their late slaves, unless, within two years, they adopted them as members of the tribe. In Jan., 1878, they concluded to adopt the negroes. The nation has a printed constitution prefaced by a declaration of rights, which asserts that all political power inheres in the people; that all men should be free to worship God according to the dictates of their conscience, and not be compelled to attend, erect, or support any religious ministry against their consent; that there should be freedom of speech; that there should be security from unreasonable searches of property or person; that every person accused of crime should have a speedy trial. All free males 19 years old or over who are Chickasaws by birth or adoption, may vote, unless idiotic, insane, or convicted of infamous crime. There are a senate and house of representatives, the latter of 18 members elected annually by the voters of the counties or districts. A representative must be 21 years old. There are 12 senators elected for two years from the four districts of the state. A senator must be 30 years old, a Chickasaw by birth or adoption, and a resident of his district six months. The governor must have all the qualifications of a senator; he is chosen for two years by popular vote, and has about the same powers and functions as a governor of one of the states. There is a supreme court consisting of a chief and two assistant justices elected to the legislature for four years. There are also circuit and county courts. The

nation has in the custody of the federal government \$1,200,000 in bonds on which interest is paid. In 1890, the number of Chickasaws was only 8464. The reservation contains fine farming lands.

**CHICKEN-POX**, a contagious febrile disease, chiefly of children, and bearing some resemblance to a very mild form of small-pox (q.v.). C. is distinguished by an eruption of vesicles or blebs, which rarely become pustular or yellow, and leave only a very slight incrustation, which falls off in a few days, without any permanent mark or pit, as in small-pox. From its vesicular character, it has been called the *crystal pox*. It has been argued that C. is, in fact, only small-pox modified by previous vaccination; but this opinion, though maintained on good authority, is not generally received by medical men. It is a disease of little or no danger, the fever being often hardly perceptible, and never lasting long.

**CHICKEN SNAKE**, or **MILK SNAKE**, *Ophibolus eximius*, a harmless individual of the serpent tribe, frequenting houses, stables, and dairies. It is sometimes 5 ft. long, though usually much less; the color is milky white above, sometimes tinged with red, with dusky spots along the vertebral line and smaller spots along the sides, the abdomen silver white or yellowish. It feeds on insects, mice, toads, frogs, and small birds.

**CHICKERING**, JONAS, 1797-1853; a self taught piano-maker of Boston, who succeeded in establishing the largest piano-manufactory in the country, at times producing at the rate of 1,500 instruments in a year.

**CHICK PEA** (*Cicer*), a genus of plants of the natural order *Leguminosae*, sub-order *Papilionaceae*, having pinnate leaves; solitary, axillary, stalked flowers; and two-seeded pods, inflated like bladders. The common C. P. (*C. arvensis*) grows wild in the corn-fields of the countries around the Mediterranean sea, and in many parts of the east. It is an annual, 1½ to 2 ft. high, of a stiff upright habit, covered with glandular hairs. The seeds abound in farina, and have a slightly bitterish taste. They are about the size of common peas, curiously wrinkled, so that they have been thought to resemble a ram's (*arietis*) head. They are used as food, either boiled or roasted, and are the most common *parched pulse* of the east. They are an important article of French cookery. They have been in general use from the earliest times.

**CHICKWEED**, *Stellaria media*, one of the most common weeds of gardens and cultivated fields, is a species of stitchwort (q.v.). It is a native of most parts of Europe and of Asia, appearing during the colder months even on the plains of India; an annual, with a weak procumbent stem and ovate leaves, very variable; some of the smaller varieties in dry sunny situations sometimes puzzling young botanists, from having only five or three instead of ten stamens; but always characterized by having the stem curiously marked with a line of hairs, which at each pair of leaves changes from one side to another, and in four changes completes the circuit of the stem. The leaves of C. afford a fine instance of the *sleep of plants*, closing up on the young shoots at night. C. is a good substitute for spinach or greens, although generally little regarded except as a troublesome weed, or gathered only by the poor to make poultices, for which it is very useful, or for feeding cage-birds, which are very fond both of its leaves and seeds. A number of species of a nearly allied genus, *cerastium*, natives of Europe, also bear the name of C., or **MOUSE-EAR C.**, and the name is occasionally given to other plants, either botanically allied, or of somewhat similar appearance, as *holosteum umbellatum*, common in parts of Pennsylvania and New Jersey, and called **JAGGED CHICKWEED**.

**CHICLANA**, a t. of Andalusia, Spain, about 13 m. s.e. of Cadiz. It is pleasantly situated on a plain between two hills, and its houses being all built of white stone, present a cheerful appearance. It has a splendid hospital. The manufactures are linen, earthenware, and brandy. Its mineral baths are much frequented by the inhabitants of Cadiz. Pop. variously estimated, but probably about 12,300.

**CHICOPEE**, a city of Hampden co., Mass., on the e. side of the Connecticut River, at the mouth of Chicopee River, 3 miles n. of Springfield, with which and Holyoke it is connected by electric street railroads, as well as by the Connecticut River railroad. Settled about 1640, it was incorporated as a town in 1848, and was chartered as a city in 1890. It contains the villages of Chicopee Falls, Fairview, and Williamansett. Chicopee Falls supplies abundant water power for various manufactures, by means of several dams. The city is noted for the extent and variety of its manufactures, which include cotton cloth, blankets, bicycles, military equipments, knitting machines, agricultural implements, bronze statuary, brass goods, machine and mechanics' tools. There are many churches, a high, and excellent graded schools, a town hall built at cost of \$100,000, a free public library, and national and savings banks. Population, 1870, 9607; 1880, 11,286; 1890, 14,050.

**CHICORY**, or **SUCCORY** (*cichorium*), a genus of plants of the natural order *compositae*, sub-order *Cichoraceae*, distinguished by bracts in two unequal rows, the outer always reflexed, the inner latterly becoming so, a nearly naked receptacle, obovate striated achenia, and a pappus of two rows of minute scales. The species are few in number, herbaceous plants, full of milky juice, natives chiefly of the warmer temperate regions of the eastern hemisphere. The common C. or **SUCCORY** (*C. intybus*) is a perennial plant, found wild in England and most parts of Europe, growing in waysides, borders

of fields, etc. It has a long carrot-like root, externally of a dirty or brownish yellow color, and white within. The stem rises to the height of 2 to 5 ft., branching, the leaves are *runcinate*, resembling those of the dandelion; the flowers sessile, axillary, in pairs, rather large, beautiful, generally blue, more rarely pink or white. *C.* is pretty extensively cultivated, both in England and on the continent of Europe, for its roots. It is also cultivated for feeding cattle with its leaves. The blanched leaves are sometimes used as a salad, and they are readily procured in winter by placing the roots in a box with a little earth in a cellar.—To this genus belongs also the endive (q. v.).

*C.* has been used as a substitute for coffee, or to mix with coffee, for at least a century. The roots are pulled up, washed, cut into small pieces, and dried on a kiln, which leaves a shriveled mass not more than one fourth the weight of the original root. It is then roasted in heated iron cylinders, which are kept revolving as in coffee-roasting, during which it loses about 25 to 30 per cent of its weight, and evolves at the same time a disagreeable odor, resembling burned gingerbread. An improvement to the *C.* during roasting is the addition of 2 lbs. of lard or butter for every cwt. of *C.*, which communicates to it much of the luster and general appearance of coffee. It is then hand-picked, to remove chips of wood, stones, etc., and is reduced to powder, and sold separately as *C. powder* or *C. coffee*, or is added to ordinary ground-coffee, and is sold as a mixture. *C.* contains a good deal of sugar, but otherwise does not serve to supply the animal economy with any useful ingredient. It gives off a deep brown color to water, when an infusion is made, and hence its main use in coffee. Some people dislike the taste of *C.*, and when largely used, it has a tendency to produce diarrhea; but many people prefer to use coffee mixed with *C.* owing partly to the taste it communicates, but mainly to the appearance of strength which it gives to the coffee. The *C.* is liable to adulteration; and roasted beans, pease, carrots, parsnips, mangold-wurzel, acorns, horse-chestnuts, biscuit, oak-bark tan, logwood and mahogany dust, and even the livers of horses and bullocks, are said to be employed in its adulteration.

**CHI'COT**, a co. in s.e. Arkansas, on the Louisiana border and the Mississippi river, intersected by Crooked and Mason's bayous; 760 sq. m.; pop. '90, 11,419, incl. colored. The surface is level, and in some parts is subjected to inundations; chief productions, corn and cotton. Co. seat, Lake Village.

**CHICOUTIMI**, a n.e. co. of Quebec, Canada, having the ridge of land dividing the waters of the St. Lawrence and Hudson bay as its n. boundary, and the 48th parallel of latitude as its s. boundary. It is drained by Lake St. John and by a number of large rivers, including the Saguenay and the Chicoutimi. Co. seat, Chicoutimi. The counties of Chicoutimi and Saguenay form an electoral district, with pop. '91, 38,281.

**CHIEF**, in heraldry, an ordinary formed by a horizontal line, and occupying the upper part of the escutcheon. Like the other honorable ordinaries, the *C.* ought properly to take up a third part of the shield; but when the other charges are numerous, the *C.* is frequently diminished in size.—Any object borne in the upper or chief part of the shield is said to be *in chief*, though the *C.* be not divided off from the rest of the field, as a separate portion.—*On a chief*: Is when the object is represented on the *C.*, divided off as above described.

**CHIEF-JUSTICE**, the presiding justice of the supreme court of the United States, and of the courts of highest jurisdiction in most of the several states. The chief-justice of the United States administers the oath on the occasion of the inauguration of the president and vice-president; he presides when an impeached president is tried, and has the nomination of certain judicial officers.

**CHIEF-JUSTICE**. See COURT OF SESSION; JUDICIARY; JUSTICE, LORD CHIEF; JUSTICE-CLERK; JUSTICE GENERAL.

**CHIEM-SEE**, a lake of Upper Bavaria, the largest in the country, lies about 43 m. s.e. of Munich. It is situated at an elevation of more than 1600 fr. above the sea; its length is 12 m., with a breadth of 9, and its greatest depth 500 feet. Its shape is irregular, and its coast much indented. It has three islands; the Achen and Prien flow into it, and its surplus water is discharged by the Alz into the Inn. The *C.* is famous for its fish; and a small steamer which plies on it, enables travelers to view its fine scenery.

**CHIE'RI**, a t. of Piedmont, northern Italy, situated on the slope of a hill 9 m. s.e. of Turin. *C.* is an ancient place. By the later Romans it was called Carea. The church of St. Dominico, built in 1260, has some good paintings; and that of Santa Maria della Scala, built in 1405, is one of the largest Gothic structures in Piedmont. *C.* is one of oldest manufacturing towns in Europe, its manufacture of fustians and cotton stuffs dating from 1422. Silk, cotton, and linen are still important manufactures. Pop. 15,000.

**CHIE'TI** (Province). See ABRUZZO.

**CHIE'TI**, an archiepiscopal city of Italy, capital of the province of the same name, is situated on a hill near the Pescara, about 100 m. n. of Naples. It is a well-built and flourishing place, with some imposing public edifices, including a cathedral, lyceum, and theater; and its agreeable situation has made it the residence of numerous wealthy families. The district around is fertile and well cultivated, and in the city the cloth and silk manufactures are extensive. Pop. '94, 22,800.

**CHIGNECTO BAY**, the more westerly of the two inlets at the head or n. end of the bay of Fundy, in British North America. It separates Nova Scotia from New Brunswick, is 30 m. long and 8 broad, and has an isthmus of only 14 m. in width between it and Northumberland strait, in the gulf of St. Lawrence.

**CHIGOE**, or JIG'GER, *Pulex*, or *Sarcopsylla penetrans*, a species of flea (q.v.), rather smaller than the common flea, and with less powerful limbs, found in the West Indies and South America, where it is excessively troublesome, attacking any exposed part of the human body, and affecting a lodgment between the skin and flesh, often under the skin of the foot or the nails of the toes. At first, its presence is indicated only by a slight itching or tingling; but an ulceration is likely soon to be the result, which is not only very painful, but even dangerous.

**CHIGNON** (Fr., originally "the nape of the neck"), a general term for the long back hair of women when gathered up and folded into a roll on the back of the head and neck. It was a common mode of wearing the hair in the eighteenth century, the hair being often padded and powdered. In 1866 the chignon reappeared, but through the frequent addition of false hair it attained such ungraceful proportions that in 1875 it again fell into disuse.

**CHIHUAHUA**, a city of the Mexican confederation, with a considerable trade between Santa Fe, in New Mexico, and the United States. Pop. 1892, about 25,000. It is in lat. 28° 40' n., and long. 105° 33' w., and has a cathedral, and an aqueduct three m. long, besides appropriate buildings, as the capital of the state of its own name. The territory in question, stretching in lat. from 27° to 32° n., and in long. from 104° to 108° 40' w., is divided from Texas, in the United States, by the Rio Bravo del Norte. It is a tableland, more remarkable for mineral resources than for agricultural productions. It abounds in niter and other salts, and in mines of gold and silver. Pop. '96, 266,831.

**CHILBLAINS**. See CHAPPED HANDS.

**CHILD, FRANCIS JAMES, PH.D., LL.D.**, the most learned of ballad editors, was born in Cambridge, Mass., Feb. 1, 1826. He graduated at Harvard in 1846, and was an instructor there for some time in the department of mathematics, and afterwards in that of rhetoric. In 1849 he went to Europe, where he remained about two years. In 1851 he was appointed to the chair of rhetoric at Harvard, which he exchanged in 1876 for that of Anglo-Saxon and Early English literature. His first work was *Four Old Plays* (1848); but more important were his annotated editions of *Spenser* (5 vols., Boston, 1855), and his first collection of the *English and Scotch Ballads* (8 vols., Boston, 1857-59). The latter was at once recognized as the best collection of English ballad poetry. Professor Child then engaged upon a great comparative collection of ballads, *The English and Scottish Ballads*, of which eight parts were issued between 1882 and 1892. This may be accepted as the final work on its subject, as it contains all the versions and variants collected from all sources, while the introductions to each ballad are masterpieces of clearness and learning. Professor Child also contributed some valuable notes to Hale's and Furnivall's reprint of Bishop Percy's folio manuscript (1807-68); also the article on *Ballad Poetry* in Johnson's Encyclopedia. His invaluable *Observations on the Language of Chaucer and Gower*, forming two papers in the *Memoirs of the American Academy*, and reprinted in part I. of Ellis's *Early English Pronunciation* (1869), reveal a marvellously intimate knowledge of Middle English grammar. He d. in 1896.

**CHILD, Sir JOSIAH**, an eminent London merchant, and one of the popular English writers on commerce and political economy, b. in 1680, was the second son of Richard Child, a merchant of London. His principal work is entitled *Brief Observations concerning Trade and the Interest of Money* (Lond. 1688, 4to); a 2d edition, much enlarged, entitled *A New Discourse of Trade*, was published in 1690. In this work he explains his plans for the relief and employment of the poor, including the substitution of districts or unions for parishes, and the compulsory transportation of paupers to the colonies. He was one of the directors, and for some time chairman of the East India company, and is said to have written several tracts in defence of the trade to the East Indies, which were published anonymously. In 1678 he was created a baronet, and died in 1699.

**CHILD, LYDIA MARIA, 1802-80**; b. Mass. When 23 years of age she published *Hobomok, an Indian Story*, and a year afterwards *The Rebels, a Tale of the Revolution*, in which she gave a speech by James Otis, and a sermon by Whitfield, both long believed to have been made by the men themselves. For eight years she was the editor of *The Juvenile Miscellany*, a monthly magazine for the young. Among her earlier works are: *The American Frugal Housewife*; *The Girl's Own Book*; and *The Mother's Book*. She was among the first of the New England anti-slavery writers, beginning with *Appeal in behalf of that Class of Americans called Africans*; and in 1841 she became one of the editors of the *National Anti-Slavery Standard*, in which paper she published her popular *Letters from New York*. Subsequently she published *History of the Condition of Women in all Ages and Nations*; *Biographies of Good Wives*; *Life of Isaac T. Hopper*; *Progress of Religious Ideas*; *Autumnal Leaves*; *Looking towards Sunset*; *The Freedman's Book*; *A Romance of the Republic*, etc.

**CHILDREMAS** or **HOLY INNOCENTS' DAY** (28th Dec.), is observed by the church of Rome with masses for the children killed by Herod. It was considered unlucky to marry or to begin any work on this day. The learned Gregory says: "It hath been a custom and yet is elsewhere, to whip up the children upon Innocents' day morning, that the memory of Herod's murder might stick the closer" It is also a holiday in the church of England.

**CHILDERS**, HUGH CULLING EARDLEY, b. London, 1827; successively sec. of state, chancellor, exchequer, home sec., in Gladstone's cabinets, 1880-86. He graduated from Trinity coll., Cambridge. Emigrating to Australia he there made a study of politics. He was appointed commissioner of trade and customs in the Australian cabinet. He returned to England, 1857, and stood as the liberal candidate for Pontefract, gaining the seat after some legal opposition. C. became a lord of the admiralty, 1864, and financial secretary of the treasury, 1865. In 1872 he re-entered the ministry as chancellor of the duchy of Lancaster. C. wrote in behalf of free trade and national education, and was a fellow of the Royal society. He d. in 1896.

**CHILDREN**, SOCIETIES FOR THE PREVENTION OF CRUELTY TO. Organizations now exist in many of the states having for their object the proper protection of children against the cruelty of parents and guardians, as well as against the illegal demands of corporations and employers. Bills have been passed in the state legislatures, often largely through the influence of these societies, limiting the age of minors employed by manufacturers, and also the working hours of children and women in mills and factories. In Mass. children under 14 years of age are forbidden employment in manufacturing, mechanical, and mercantile establishments, while the public schools are in session, unless they can read and write. In N. H., an act has been passed prohibiting the employment of children under 10 years of age. In Mich., the employment of children under 10 years of age by showmen, the giving of obscene books, pamphlets, etc., to minors, and the exhibition of the same in view of passing children, are prohibited. In N. Y., by a bill passed in 1885, ten hours are made the limit of daily work in factories for minors and women; and children under 13 years of age, unable to write, are prohibited employment. All these and similar laws, the societies for the prevention of cruelty to children are authorized to see enforced; and in the performance of their work they may call upon magistrates and officers of police for aid.

**CHILDREN**, JOHN GEORGE, 1777-1852; an English scientist who traveled in the United States, devoting his attention chiefly to electricity and galvanism. Among his papers, are those discussing the conversion of iron into steel by union with diamond, and a method of extracting silver from the ore without amalgamation. He translated Berzelius on the blow-pipe, and Thenard on chemical analysis. He was for some years secretary of the royal society.

**CHILDREN'S AID SOCIETIES**, first established in New York city, chiefly by the exertions of Charles L. Brace, about the year 1858. The object of this and its many imitative societies is to care for the poor and neglected children of large cities, to rescue them from want and crime, afford rudimentary education, and provide homes for them, usually among the farmers of the agricultural states.

**CHILDRESS**, a co. in Texas, bordering Indian Terr. on n.; formed 1876; drained by Red river; 750 sq. m. Pop. '90, 1175. Co. seat, Childress.

**CHILDS**, GEORGE WILLIAM, LL.D., philanthropist, was b. at Baltimore, Md., in 1829; entered the navy at the age of thirteen, and spent fifteen months in the service. He then became a clerk in a bookstore in Philadelphia; at the age of eighteen established an independent business, and in 1849 became a partner in the publishing house of Childs and Peterson. In 1864 he purchased the *Public Ledger*, one of the earliest cheap newspapers of the country, which under him attained a wide circulation and influence. His public gifts were munificent, including a memorial window in Westminster Abbey to Cowper and George Herbert; one in St. Margaret's, Westminster, to Milton; a reredos in St. Thomas's, Winchester, commemorating Bishops Ken and Andrews; a monument at Kensal Green to Leigh Hunt; a memorial fountain at Stratford-on-Avon; and, in his own country, the presentation to the Typographical Society of Philadelphia of the printers' cemetery, "Woodlands," in that city; the erection of monuments over the graves of Edgar A. Poe and Prof. Richard A. Proctor, the erection of a stone cross on the site of the first Christian service on the California coast at Point Reyes, and a subscription that made possible the erection and endowment of the Home for Union Printers at Colorado Springs, Col. In 1885 he published *Recollections of General Grant*, and in 1889 a volume of *Personal Recollections*. He d. in 1894.

**CHILD STUDY**. See GENETIC PSYCHOLOGY.

**CHILE** (or **CHILI**), a South American republic, on the Pacific coast, extends from about lat. 18° to 55° 58' 40" s. (Cape Horn), and is bounded on the north by Peru, and on the east by Bolivia and the Argentine Republic. Its length, including Terra del Fuego, is nearly 2500 miles; its breadth varies from 40 to 200 miles; its area is about 294,000 square miles. In 1881, Patagonia west of the Andes, with the greater part of Terra del Fuego, was acquired by treaty with the Argentine Republic, and as a result of the war of 1879-83, Chile, in 1883, annexed the Bolivian territory of Antofagasta, and the Peruvian department of Tarapacá. The Peruvian territories of Tacna and Arica

were to remain subject to Chile until a popular vote should decide the question of ownership. The vote should have been taken in 1894, but was postponed.

*History.* Chile is said to derive its name from an ancient Peruvian word signifying "snow." Originally occupied by Indian tribes, prominent among whom were the Araucanians, it was in great part conquered by the Peruvian incas, and was held by them during the period 1433-1533. The Spaniards, after obtaining possession of Peru, invaded Chile (1534) headed by Almagro, a companion of Pizarro, and although repulsed, made a second entry (1540) under Valdivia, who founded the cities of Santiago and Valdivia. The conquerors held the country with difficulty, and conflicts with the Araucanians continued until 1723, when a treaty of peace was made, and the river Biobio became the boundary between the races. The governors of Chile were appointed by the viceroys of Peru up to 1810, when the people declared their independence, and appointed a triumvirate. The Peruvian army was twice defeated by the republican troops, but Chile was finally forced to submit to Spanish rule for three years, when, aided by forces from Buenos Ayres, the patriots gained another victory, at Chacabuco, Feb. 12, 1817, and a decisive one on the plains of Maipú, Apr. 5, 1818. From 1817 to 1823, the government was administered by a dictator, Don Bernardo O'Higgins, a native of Chile, who had been prominent in the rebellion. Other dictators followed, and other triumvirates, but the Spanish troops continued to harass the country till 1826, and internal dissensions occurred until 1847, although the present constitution, promulgated in 1833, had a beneficial effect in the field of politics. A dispute with the Argentine Republic over the possession of Patagonia arose in 1848, and was not definitely settled until 1885, when Chile renounced all claims to the eastern part of that country. A controversy with Bolivia over some ceded territory and the taxation of resident Chileans, led to the invasion of Bolivia, which was followed by an alliance between Bolivia and Peru and a declaration of war against Chile (Apr., 1879). After a severe conflict, during which Lima and Callao were captured, and also the Peruvian war-ships, a treaty was concluded, Oct. 30, 1883, by which Chile secured additional territory, as stated above. In Jan., 1891, a rebellion broke out, the outcome of a long-standing disagreement between the Chilean congress and President Balmaceda, who had, it was asserted, assumed dictatorial powers and violated the constitution. The navy and part of the army joined in the revolt; the ports were besieged by the fleet, the province of Tarapacá was captured by the insurgents, and severe battles occurred on land and sea. Bolivia, alone, recognized the insurgents; ceding Antofagasta to them in perpetuity, in return for the cancellation of old war-debts, and for permission to import merchandise free of duty by way of that port. On July 27, 1891, the insurgents won a decisive victory and captured Valparaíso, and Balmaceda soon after committed suicide, after which order was restored.

*Topography.* From the northern part of Chile to lat. 41°, the Andes form two parallel chains with a mean elevation of 11,830 feet, enclosing a table-land or broad valley. The eastern range attains, in the volcanoes of Aconcagua and Tupungato, heights of 28,000 and 20,269 feet respectively; the western, or coast range, is lower. The single chain, which constitutes the Patagonian Andes, has a comparatively low elevation, mount Stokes, in lat. 50° 30' s., the highest peak, being only 6400 feet high. Glaciers descend from these Patagonian mountains, and the coast is indented by numerous inlets of great depth. There are twenty-three volcanoes in Chile, some of which are occasionally active. A number of passes cross the Andes, one of which, Doña Ana, has an altitude of 14,770 feet, but during the winter months they are closed to travel. The rivers, which are largely dependent on the melting of the mountain snows, are of inconsiderable size north of lat. 34°. The largest and longest (220 miles), the Biobio, on which the city of Concepción stands, is navigable for barges and small steamers for 100 miles. Southern Chile contains a number of lakes, and mineral springs are found throughout the country. Of the islands belonging to Chile, the most important are those forming the province of Chiloe (q.v.), and the most celebrated is that of Juan Fernandez. Of the few good harbors, that of Valparaíso is the most important for its commerce, but Talcahuana and Coquimbo are better protected.

*Geology.* The predominant rocks of Chile are crystalline and metamorphic. They form the range of the Andes, except in those districts in which active volcanoes exist, where they are covered with recent volcanic rocks. They occupy also the whole of the level ground between the mountain-range and the shores of the Pacific, with the exception of a narrow stretch of palaeozoic fossiliferous strata which run along the coast south from Santiago for a distance of 300 miles. The coast-line of Chile is being continually altered from the elevation of the whole country to an extent of at least 1200 miles along the Pacific shores, produced by volcanic agency. In 1823, the coast was raised four feet at Quintero, and three feet at Valparaíso, a change of level that was permanent over an area of 100,000 square miles. A similar extensive elevation was noticed in 1885 by Capt. Fitzroy.

*Minerals.* Chile has great mineral resources including mercury, iron, zinc, manganese, coal, nickel, antimony, arsenic, bismuth, and sulphur. In what is called the mineral belt there are rich mines of gold, silver, and copper. The nitrate fields are of immense value and constitute the main source of the country's revenue. The industry has been largely developed through British capital. The mineral resources of the country have not been fully developed, but rapid progress has been made in recent years.

*Fauna and Flora.* As enumerated by the naturalist Gay, there are seven species of *cheiroptera*; twelve of *carnivora*, including the puma, wildcat, fox, polecat and otter;

six of *phocidae*; one marsupial; twenty-five of rodents, including the chinchilla; two of *edentata*; three ruminants: the guanaco, and two kinds of deer. There are two species of whale and two of dolphin, and eleven species of reptiles, all harmless, besides scorpions, large spiders, ants, and upwards of 4000 species of beetles. Among the birds and water-fowl are the condor, turkey-buzzard, hawk, owl, crane, black-headed swan, flamingo, parouquet, partridge, woodpecker, and pelican. The shad, perch, and other fishes are caught, in great abundance, the *chonos*, a small kind of oyster, and mussels, and clams are found all along the coast. Horses, asses, and mules are the beasts of burden, and are raised in large numbers, as are cattle. The smaller domestic animals are of inferior breed. Bee-keeping is a profitable industry.

Chile has more than 100 different kinds of indigenous trees, very few of which are deciduous. The provinces of Arauco, Valdivia and Chiloe have the most luxuriant growth. Of special commercial value are the roble, or oak, the Chilean cedar (*Fitzroya patagonica*), the Araucanian pine, attaining, like the last mentioned, a height of 150 feet and over; the lingue, used for making furniture and tanning, and two species of cypress. The coligue, a kind of bamboo, is used for thatching roofs and for the shafts of Indian lances. Vegetation is particularly abundant in the south of Chile.

*Climate, Soil, and Agriculture.* Between the extremes of Atacama, which receives little or no moisture, and Patagonia, where the rainfall is excessive, the country has an equable and delightful climate, affording clear days and brilliant nights. December, January, and February constitute the Chilean summer. The mercury during that period sometimes registers 95°, but there is usually a sea breeze from ten o'clock to three, and the nights are always cool. Rains fall with more or less frequency from May to Oct., and vegetation is correspondingly luxuriant. The prevailing winds are from the south, but during June, July, and August, *temperales*, or violent northerly winds, occur. At Valdivia the mean summer temperature is 60°; that of winter, 46.8°; at Valparaiso, the mean annual temperature is 55°, and at Santiago, 55°. Hurricanes occur at some seasons, and earthquake shocks are frequent, but not more than sixteen of great severity have been recorded, those of 1570 and 1647 having caused the greatest loss of life.

The large extent of rocky mountain land and desert leaves but little space for agricultural products, but the soil is rich. In the northern saline pampas, extending from Peru and Bolivia to Copiapó, agriculture is only temporarily possible. The most productive region is that of the Huasco valley, and in the central part of the country, which was the older Chile. Altogether about 1½ millions of the population are engaged in agriculture. The chief products are Indian corn, wheat, barley, oats, beans, beet-root, tobacco, fruits and silk. The Pacific states are annually supplied with large quantities of Chilean flour. The productiveness of Chilean agriculture is remarkable in view of the primitive methods employed in farming. The annual production of wheat is estimated at about 23,500,000 bushels and other cereals at 8,500,000 bushels. The southern part of Chile produces a large amount of good timber. Stock-raising is carried on extensively. Besides cattle, large numbers of horses, mules, sheep and goats are reared.

*Industries, Commerce, etc.* The most important occupations of the people outside of agriculture are those connected with mining, and the great industrial centers are to be found chiefly around the Arauco coal region. But there are manufactures of glass-ware, woollens, linens, paper, earthenware, leather, soap, sugar, brandy, together with sugar refineries, gas-works, breweries, carriage and cart works, saw-mills, machine-shops, and mineral water factories. The leading articles of export are nitrate, and other mineral substances; wheat and other agricultural produce. Of these the nitrate and other mineral substances are by far the most important, the exports of nitrate in 1894 being 44,727,513 pesos out of a total of 72,040,420. The most important items in the list of imports are food substances, raw materials, machinery, and textiles. The chief countries outside of South America enjoying trade with Chile, in the order of their importance, were, in the years 1893-94, Great Britain, Germany, France and the United States. On Jan. 1, 1895, the commercial marine consisted of 188 vessels with a total tonnage of 105,642. English, German and French lines of steamers pass from Chile to Europe through the Straits of Magellan, and English and Chilean lines connect Chile with Peru and Panama. Chile took the lead among the South American countries in the construction of railways. The total length of lines open for traffic in 1894 was 1782 miles, of which 686 belonged to the state. In 1895 the length of the lines in process of construction was 496 miles, including the Trans-Andine line from Santa Rosa to Mendoza. In 1894 the country contained 584 post-offices, and there were transmitted through the mails 22,249,296 letters; 2,092,672 circulars, etc., and 28,587,020 newspapers and other printed matter. The state telegraph lines at the end of 1894 had a total length of 6965 miles with 8830 miles of wire.

*Religion and Education.*—The Roman Catholic religion is supported by the state, which nominates and pays an archbishop and three bishops. The clergy are also paid by the state, and extensive subsidies are granted for building purposes. According to the constitution all other religions are tolerated. Civil marriage is the only form acknowledged by law. Education is gratuitous and compulsory, but the extent of illiteracy is still very great. The instruction is divided into three grades: superior, secondary, and primary. Professional and secondary instruction is provided in the University, the National Institute of Santiago, and in the lyceums and colleges established in the



provinces. The principal institution for secondary education is the National Institute at Santiago, which was founded in 1813. The faculties of the University include law, physical and mathematical sciences, medicine, and the fine arts; and the number of students enrolled for the study of these branches in 1894 was 1190. In the National Institute and the provincial colleges, 8710 students were enrolled in 1895. The government maintains lyceums for girls at Santiago. In addition to these institutions there are normal and agricultural schools, and schools for special training, together with theological seminaries at the seats of the bishops, Pædagogic Institute, the National Conservatory of Music, the National Observatory, School of Arts and Trades, Institute of Deaf Mutes, and public museums. The public primary schools in 1895 numbered 1248, with 114,585 pupils and 2145 teachers. There are besides, 411 private schools, with an attendance of 18,052. The National Library contains a large number of volumes of printed books as well as of manuscripts. The census of 1885 made a very unfavorable showing in regard to illiteracy. There were only 634,627 people out of the entire population who could both read and write, and there were 96,636 who could only read.

*Government.*—Santiago is the capital. The constitution of 1833, still in force, is based upon that of the United States. Every citizen 21 years of age, and able to read and write, is entitled to a vote. The President is elected by delegates chosen by ballot of the full electorate. His salary is fixed at 18,000 pesos, and 12,000 pesos for expenses. After his term has expired he is not eligible for re-election. Like the President of the United States he has the right of veto, and a bill may be passed over his veto by a  $\frac{2}{3}$  majority of the Congress. He is aided in his executive functions by a Council of State consisting of five members nominated by himself and six members chosen by the Congress. There is also a Ministerial Council or Cabinet which is divided into seven departments under six ministers:—Of the interior; of foreign affairs; of worship and colonization; of justice and public instruction; of finance; of war and marine; of industry and public works. The legislative power is in the hands of a Congress consisting of two chambers called respectively the Senate and the Chamber of Deputies. The Senate consists of members elected for six years by the provinces. The number of senators bears the ratio of one for every three deputies. The deputies are chosen for a period of three years by the departments. The ratio of representatives to the population is one deputy to every 30,000 inhabitants. The deputies and senators are required to have a certain income, and do not receive salaries. The provinces are governed by intendentes, and are divided into departments which are under the administration of a governor. Both the provincial and department chiefs are nominated by the president. The departments, again, are divided into sub-delegations or cantons, under sub-delegates appointed by the governors, and into town-districts under inspectors appointed by the sub-delegates. The town-districts elect, every three years, their own municipal government. The judicial system is presided over by the Supreme Court, resident at Santiago, consisting of six members. It takes cognizance chiefly of cases of real estate, criminal cases, and war claims. Each department has one or more justices of the peace for ordinary cases. There are courts of appeal at Santiago, Serena, and Concepcion. The civil code, promulgated in 1858, is largely a copy of the Code Napoléon, and the military code is largely taken from the ordinances of Spain.

*Finance.*—Chile ranks very high among the South American states in the matter of financial credit. In 1894, its revenue amounted to 83,496,000 pesos, and its expenditures to 78,482,000 pesos. The estimated revenue for 1897 was 79,200,000 pesos and expenditures 79,155,971 pesos. The public debt of Chile on Dec. 31, 1895, was: external, £13,539,760; internal, 36,624,581 pesos. In 1896 there was a 5 % loan negotiated in London for the purpose of defraying the expenditures of railway construction and other public works. There is no state bank in Chile, but there is a national banking system in accordance with which the banks are required to guarantee their note issue by depositing government notes or securities in the Treasury. The number of joint stock banks of issue in 1895 was 23 with a capital of 50,818,829 pesos. Their registered issue was about 19,500,000 pesos, which is within the authorized limit of 24,000,000 pesos. There are also land banks which issue interest bearing scrip, payable to bearer, and loan money on the security of landed property. By the conversion law of Feb. 11, 1895, it was required that the redemption of paper currency should be carried out from June 1st of that year, at the rate of 18d. to a peso. In 1896, the value of a peso in United States money was 38½ cents.

*Defence.*—According to the law of Nov. 22, 1895, the regular army must not exceed 9,000 men. It consists of 5 regiments of artillery; 9 of infantry; 8 of cavalry; and 4 of engineers. Besides the regular army there is a National Guard which is subject to mobilization whenever required. Every Chilean between the ages of 20 and 40 is obliged to serve. It is estimated that under this system some 25,000 will annually receive military instruction. In 1896 the Chilean fleet, including ships in process of construction, consisted of 4 armorclads, 5 large cruisers, several small cruisers, and a torpedo flotilla. The small battleship *Capitan Prat* is a remarkable vessel. Her guns are worked either by electricity or by hand, and she possesses a powerful armament, and at the same time is capable of a high rate of speed. Another powerful vessel of the Chilean navy is the *Esmeralda*.

*Population, etc.* The aboriginal races comprise the Araucanians (see ARAUCANIA), polytheists in religion, divided into tribes under a cacique, the industrious agriculturists and rearers of herds, and the Patagonians, monotheists (see PATAGONIA). The other inhabitants, or Chileans proper, are of Spanish descent but mostly of mixed

blood. Their language is Spanish with some admixture of Indian words, and their customs and characteristics are European. The country is divided into 22 provinces. According to the official census of 1885, the population was 2,527,320. In 1894, according to the official estimate of December of that year, it had increased to 2,963,687. The following table, taken from the *Statesman's Year Book* for 1897, gives the area and population according to the census of November 26, 1885, together with the estimated population, etc., for 1894.

PROVINCES AND TERRITORIES.	Capitals.	Area; Sq. m.	Population 1885 Census.	Pop. estimated Dec. 1894.	Pop. per Sq. m. 1894.
Magallanes, territory.....	Punta Arenas.....	75,292	2,085	3,624	....
Chilo.....	Ancud.....	3,995	73,420	82,362	20.6
Llanquihue.....	Puerto-Montt.....	7,823	62,809	81,361	10.4
Valdivia.....	Valdivia.....	8,315	50,938	65,186	7.8
Arauco.....	Lebu.....	4,248	73,653	92,624	21.8
Cautin.....	Temuco.....	3,126	33,291	46,959	15.0
Mallico.....	Angol.....	2,866	59,492	75,258	26.3
Bio-Bio.....	Angol.....	4,158	101,768	133,539	32.1
Concepcion.....	Concepcion.....	3,535	182,459	244,841	69.2
Nuble.....	Chillan.....	3,566	149,871	167,399	47.1
Maule.....	Cauquenes.....	2,930	124,145	129,783	44.2
Linares.....	Linares.....	3,488	110,652	120,099	34.4
Talca.....	Talca.....	3,678	133,473	165,642	45.0
Curico.....	Curico.....	2,913	100,002	107,380	36.8
Colchagua.....	San Fernando.....	3,795	155,687	163,338	42.9
O'Higgins.....	Rancagua.....	2,524	87,641	94,774	37.3
Santiago.....	Santiago.....	5,223	329,753	410,437	78.5
Valparaiso.....	Valparaiso.....	1,637	203,320	230,990	141.1
Aconcagua.....	San Felipe.....	5,840	144,125	157,516	26.9
Coquimbo.....	Serena.....	12,905	176,344	199,677	15.5
Atacama.....	Copiapó.....	43,180	76,566	73,218	1.7
Antofagasta.....	Antofagasta.....	60,968	21,213	26,969	0.6
Tarapacá.....	Iquique.....	19,300	45,086	49,082	2.5
Tacna.....	Tacna.....	8,685	29,523	32,191	3.7
Grand Total.....	.....	293,970	2,527,320	2,963,687	10.8

In 1885 there were: 1,263,645 males and 1,263,675 females, and the foreign population numbered 87,077, including 84,901 Peruvians, 13,146 Bolivians, 9835 Argentines, 6808 Germans, 5303 English, 4198 French, 4114 Italians, and 2508 Spanish, etc. The Anglo-Americans numbered only 924. The cities having a population exceeding 20,000 in 1890 were: Santiago, 250,000; Valparaiso, 150,000; Talca and Concepcion, each 24,000, and Chillan, 21,000. The births, in 1895, were 110,154, and the deaths 92,197. In 1895 a new census was taken and the preliminary report of it was issued in 1897. According to this, the total population of the Republic was 2,712,145, an increase of 184,824 over the census of 1885. The following provinces showed the largest increase, Cautin, Malaco, Santiago, Antofagasta and Tarapacá. The following provinces showed a decrease, Bio-Bio, Arauco, Linares, Aconcagua and Coquimbo. The chief statistician said in his report that the figures might be far from giving a correct census of the population, for he had been informed that in some rural districts  $\frac{1}{2}$  of the inhabitants did not figure in the census reports. See the monthly bulletin of the Bureau of American Republics, April 1897. See also Sir Horace Rumbold, *Le Chili* (Paris, 1877); Robiano, *Chili* (Paris, 1882); Markham, *The War between Chili and Peru* (1883); the United States navy report, *The War on the Pacific Coast of South America* (Wash., 1885); the *Historia General*, by Arana (Val., 1863), and that by Rosales (1878), and Briseño, *Catálogo de su Biblioteca Chileno-Americana* (Santiago, 1887).

**CHILLAN**, a town in the province of Nuble, Chile; 120 miles northeast of Concepcion, 35° 56' south, and 71° 37' west. The houses have only a ground floor and are built around rectangular courts; the streets are sixty to seventy feet wide, having open drains in the centre. C. is in the centre of a large agricultural district of great productiveness, and is an important outlet for grain and cattle by railroad to Tomé. The place is also celebrated for mineral baths. The town was founded by Ruiz de Gamboa in 1594, but has since been several times destroyed and reconstructed. Its present population is about 21,000.

**CHILLED STEEL.** See **ANNEALING**; **IRON**.

**CHILLICOTHE**, a city, and co. seat of Livingston co., Mo., on the Wabash, the Burlington Route, and the Chicago, Milwaukee, and St. Paul railroads; 74 miles n.e. of Kansas City. It is the largest city in the Grand River valley; has large agricultural, lumbering, coal mining, and stock raising interests, electric lights and street railroads, and waterworks; and contains a normal school and business college, Hazleton public school, St. Joseph's Academy, high school, national banks, and daily and weekly newspapers. Pop. '90, 5717.

**CHILLICOTHE**, a city and co. seat of Ross co., Ohio, on the Scioto river, the Ohio and Erie canal and the Baltimore and Ohio Southwestern, the Cincinnati, Hamilton, and Dayton, and the Norfolk and Western railroads; 50 miles s. of Columbus. It is in an agricultural and iron and coal mining region, and has churches, banks, court-house, railway shops, and manufactures of wagons, furniture, paper, etc. Founded in 1796, and former capital of the state. Pop. '90, 11,288.

**CHILLINGHAM CATTLE**, a breed of the so-called wild cattle of Britain (*Bos taurus var. Scoticus*), preserved in Chillingham Park, Northumberland, England. This park, the property of the Earl of Tankerville, is a remnant of one of the great forests of Britain. It was formerly believed these cattle, other herds of which are found at Cadzow, near Chillingham, at Chartley, Staffordshire, Somerford and Lyme, Cheshire, and Kilmory, Argyllshire, had descended from the Urus (q.v.) without contact with any domesticated breed, but it is now held that the remote ancestors of the existing animals must have been partially domesticated. The Chillingham cattle, which approach most nearly to the true *primigenius* type, number about sixty, and are described as of medium size, compact in body, and dingy-white in color, with black-tipped horns, brownish muzzle, and red ears. They are timorous, unless hard-pressed, and feed by night. The cows conceal the calves under tall ferns and undergrowth, and resist all approach to them. It is said that these cattle refuse to mingle with any other. This prevents degeneracy of breed, and the accepted characteristics are also maintained by destroying any calf that shows deviations of color.

**CHILLINGWORTH, WILLIAM**, a famous theologian of the church of England, was b. at Oxford in 1602, and educated at Trinity college in that university, where the arguments of a Jesuit named Fisher induced him to become a Roman Catholic. He withdrew to Douay; but was induced by his godfather, Dr. Laud, then bishop of London, to re-examine the whole controversy between Catholics and Protestants, and, in 1631, he returned to the bosom of the Anglican church. Four years later, he published a work, entitled *The Religion of Protestants a Safe Way to Salvation*. It was exceedingly keen, ingenious, and conclusive in point of argument. C. was perhaps the ablest disputant of his age; and had there not been a certain sickliness and want of solidity about his intellect, and a nervous suspicion that all human reasoning might be vitiated by undiscovered fallacies, he might have produced a really great work. *The Religion of Protestants* acquired a wide popularity. C. was offered church preferment, which he at first refused—having certain scruples in regard to the subscription of the 39 articles—but afterwards accepted. He became chancellor of the church of Sarum, and prebendary of Brixworth, in Northamptonshire. He was a strong royalist, and, on the breaking out of the civil war, accompanied the king's forces. He died Jan., 1644. The best edition of *The Religion of Protestants* appeared in 1742, with sermons, etc.

**CHILLON**, a celebrated castle and fortress of Switzerland, in the canton of Vaud, 6 m. s.e. of Vevay. It is situated at the e. end of the lake of Geneva, on an isolated rock, almost entirely surrounded by deep water, and is connected with the shore by a wooden bridge. The castle is said to have been built in 1238, by Amadeus IV. of Savoy, and it long served as a state prison. It is famous as the prison of Bonivard, the prior of St. Victor, who having, by his efforts to free the Genevese, rendered himself obnoxious to the duke of Savoy, was carried off by emissaries of that potentate, and confined here for six years, at the end of which time the castle had to surrender to the Bernese and Genevese, when Bonivard was liberated. C. has been immortalized by Byron's *Prisoner of Chillon*. The castle is now used as a magazine for military stores.

**CHILMA'REE, or CHALAMARI**, a t. in British India, in the presidency of Bengal, 35 m. s.e. of Rangpur, on the Brahmaputra. It is remarkable chiefly as the seat of a great religious and commercial festival.

**CHILÓE**, the insular province of Chill (q. v.), is an archipelago on the w. side of South America, which takes its name from its principal island. It is separated from the rest of the republic, or rather from Patagonia, by the gulf of Ancud, extending in s. lat. from 41° 40' to 43° 20', and in w. long. from 73° to 74°. The province—which, in 1894, numbered 82,262 inhabitants—contains, in addition to C. proper, about 60 islets, of which about 30 are uninhabited. In the archipelago are two towns, both of them seaports of C. proper—Castro, the ancient capital; and Ancud, or San Carlos de Ancud, the modern seat of government, towards the n.w. extremity. The atmosphere, like that of the mainland opposite, is excessively moist; the westerly winds, more particularly in winter, bringing almost constant rains. The climate, however, is on the whole healthy. This fact is the more remarkable, inasmuch as C. proper (95 miles by 35) is one natural forest, with a partially cleared and cultivated margin on the sea. The chief products are wheat, barley, potatoes, apples, and strawberries; and cattle, sheep, and pigs are reared in considerable numbers. Agriculture, however, is in a very primitive state; and the staple food of many consists of mussels and oysters. The population, equally indolent and poor, has a great preponderance of aboriginal blood. Schools are numerous, but, from the ignorance of the teachers, education has not made satisfactory progress. The principal manufacture is a coarse woollen cloth dyed blue. This archipelago was discovered by the Spaniards as late as 1558; and as it was the last integral portion of Spanish America to be colonized, so also was it the last to throw off the mother-country's yoke.

**CHILOGNA'THA and CHILO'PODA**. See MYRIAPODA.

**CHILON**, or CHILO, one of the seven sages of Greece, by birth a Lacedæmonian. He appears to have lived about the 6th c. b.c. It is said that he died from joy, on learning that his son had gained a prize in the Olympian games. Many of his apophthegms have been handed down to us. According to Chilon, the greatest virtue of man was prudence, or well-grounded judgment as to future events.

**CHILPERIC**, the name of two kings of the Franks. Chilperic I. obtained the kingdom of Soissons on the death of his father, Clotaire I., in 561. He was assassinated in 584.

**CHILTERN HILLS**, the s. part of the low chalk range which runs n.e., about 70 m., from the n. bend of the Thames, in Oxfordshire, through Bucks and the borders of Herts and Beds, and ends in Norfolk and Suffolk.

**CHILTERN HUNDREDS**. In former times, the beech-forests which covered the Chiltern Hills, in Buckinghamshire, were infested with robbers, and in order to restrain them, and protect the peaceable inhabitants of the neighborhood from their inroads, it was usual for the crown to appoint an officer, who was called the steward of the Chiltern Hundreds. The office, which has long ceased to serve its primary, now serves a secondary purpose. A member of the house of commons cannot resign his seat unless disqualified either by the acceptance of a place of honor and profit under the crown, or by some other cause. Now, the stewardship of the C. H. is held to be such a place, and it is consequently applied for by, and granted, in the general case as a matter of course, to any member who wishes to resign. As soon as it is obtained, it is again resigned, and is thus generally vacant when required for the purpose in question. When the C. H. are not vacant, however, the same purpose is served by the stewardship of the manors of East Hendred, Northahead, and Hempholme. As to the offices which are held to vacate seats, see **ELECTION**. "The practice of granting the C. H. for the purpose above described began only about the year 1750, and its strict legality has been doubted, on the ground that the stewardship is not an office of the kind requisite to vacate a seat. The gift of the C. H. lies with the chancellor of the exchequer, and there is at least one instance of its being refused. This was in 1842, and the circumstances will be found in the *Standard Library of Political Knowledge*, p. 500.

**CHILTON**, originally **BOKER**; a co. in central Alabama, having Coosa river on the e.; intersected by Louisville and Nashville railroad. Pop. '90, 14,549, incl. colored. Productions, corn, wheat, oats, cotton, and sweet potatoes. 710 sq.m. Co. seat, Clanton, formerly Grantville.

**CHIMÆRA**, a genus of cartilaginous fishes, and type of a distinct order, holocephali, which is often ranked with the sharks and rays, or elasmobranchs. The chief distinctions are the presence of a fold of skin covering the (4) gill-clefts, the nakedness of the skin, the fusion of the upper jaw to the skull, the separation of anal, urinary, and genital apertures. There are no spiracles nor "spiral-valve." There are two living genera—*C.* and *Callorhynchus*. The best-known species of *C.* (*C. monstrosa*), called in Gt. Britain *king of the herrings*, from its fondness for them, and in the U. S. *sea cat*, is found on the coasts of Europe and Japan, in the North Atlantic, and at the cape of Good Hope. It is seldom over 3 ft. in length, of a whitish color, spotted with brown above. The males have clasping organs; the large eggs are enclosed in a leathery case. See illustration, *FISHES*, vol. VI., figure 15. *C. Collet* is found on the w. coast of North America; *C. Affinis* on the coast of Portugal. In *Callorhynchus*, a s. Pacific genus, the snout bears an appendage, and the tail is not symmetrical as in the above, but slightly shark-like.

**CHIMÆRA**, a mythical monster, described by Homer as having a lion's head, a goat's body, and the tail of a dragon. The rationalistic account of *C.* is, that it represented a mountain in Lycia whose top was the resort of lions, its middle of goats, and the marshy ground at the bottom of which abounded with serpents. In the same manner, Belerophon's (q.v.) victory over the *C.* is explained by saying, that he first made his residence on this mountain. The myth seems, at all events, to have belonged to Asia Minor, as gigantic carvings of the *C.* on rocks are there found. It is usually represented as a lion, out of the back of which grows the head and neck of a goat.—*C.* is used figuratively to denote any monstrous or impossible conception, the unnatural birth of the fancy. It is frequently depicted on shields, as a heraldic charge.

**CHIMAPHILA**. See **WINTER-GREEN**.

**CHIMARA**, or **CHIMARI**. See **CERAUNIAN MOUNTAINS**.

**CHIMAY**, a town in the province of Hennegau (Hainaut), Belgium, an arrondissement of Thuise, on the river Blanche, and on the railroad from Mariembourg to Laon, 82 miles s.e. of Mons. It has a fine chateau situated in a park belonging to the Prince of Chimay, two churches, an atheneum, a bishop's seminary, iron works, breweries, and marble quarries. Pop. 1890, 3308.

**CHIMAY, JEANNE MARIE IGNAZÉ THÉRÈSE**, Princess of; 1773-1835; daughter of count Cabarrus, minister of finance in Spain; early married to M. de Fontenay, soon divorced, and next married to Tallien, the French revolutionist, whom she induced to engage in a plot for the overthrow of Robespierre, and thus made herself the chief promoter of the revolution of July, 1794. Her beauty and her free manners with her consequent social triumphs gave her husband offense, and he left her, going with Napoleon to Egypt. A mutual divorce followed on his return, and Jeanne then married count Caraman, with whom she lived peaceably. While ranking first among the beauties of the time, she was never admitted to court circles.

**CHIMBORAÇO**, a conical peak of the Andes, in Quito, 20,517 ft. above the sea, but only about 11,000 above the level of its own table-land. It is capped with perpetual snow, and was long regarded as the loftiest mountain in the world. Latterly, how-

ever, it has been ascertained to be overtopped by some peaks, not merely of the Himalayas, but even of the central division of its own chain. Its lat. and long. are  $1^{\circ} 20' \text{ a.}$ , and  $79^{\circ}$  west. The summit was for the first time reached by Stübel in 1872. Humboldt ascended within 2,188 ft. of it, and Boussingault and Hall within 1729.

**CHIMÈRE**, "the upper robe worn by a bishop, to which the lawn-sleeves are now generally attached." Since the time of queen Elizabeth, it has been of black satin, but previously it was of a scarlet color, like that worn by the bishops when assembled in convocation, and when the sovereign attends parliament.

**CHIMES**, music performed on bells in a church tower, either by the hands of a performer or by mechanism. The most perfect C. are to be found in Holland and Belgium.

This ancient and interesting class of music is believed to have originated in some of the German monasteries, and the first instrument for the production of C. to have been made in 1487 at Alost, in the Netherlands. Among the celebrated chimes of Europe are those of Copenhagen, Ghent, and Amsterdam. A number of bells is required for a proper execution of this music. The *carillons à clavier* are played like a piano-forte; the keys are handles connected with the bells by rods or cords, and the *carillonneur* employs his hands and feet to play an air. The pedals communicate with the larger bells for the bass. The keys on which the treble notes depend are struck with the hand, which is protected by a leather covering. It is stated that Potthoff, a blind organist of Amsterdam, was able to perform fugues on this instrument. The invention of carillon machinery is of modern origin; one person now is able by simply turning a barrel similar to that of a music box to chime eight bells with little difficulty. C. have been largely introduced into our American churches. In New York there are four churches that have large chimes, St. Thomas, Grace, Trinity, and St. Ann's. The C. of Christ church in Philadelphia, Christ church in Boston, and Trinity church in New York, are probably the oldest in this country. Little is known of the Trinity church bells, except that five of them were cast in London before the year 1845. The ten bells have an aggregate weight of about 15,000 lbs.; the largest weighs 3,081 lbs., the smallest, 700 lbs.; they are hung in a frame-work of wood, and the machinery is somewhat primitive. St. Thomas church has ten bells which were cast at Meneely's in w. Troy, and put up in 1874; they are very fine in tone and tune. Grace church has ten bells with an aggregate weight of 10,300 lbs., the largest, called the Rector's bell, weighs 2,835 lbs.; they are played on by means of a *carillon à clavier*, like those in Holland. The C. of old Christ church in Philadelphia are of historic interest. These bells were sent from England as a present from Queen Anne; they were taken down during the revolution, and sunk in the Delaware river, as it was feared the British might capture them. At the close of the war they were hung in the old belfry; and may now be heard on every holiday through the year. Christ church in Boston also has an ancient and notable chime. Full and partial chimes, the latter called peals, can now be heard in all parts of the country. There are three sets of chimes in Troy, N. Y. The church of the Good Shepherd, in Hartford; St. James church in Birmingham, Conn.; old St. John's in Savannah, Ga.; churches of different denominations in Indianapolis, Petersburg, Va.; Cleveland, O.; Concord, N. H.; Rochester, N. Y.; and many others, produce chime music. Worth mentioning are those of St. Ann's, in Brooklyn; St. John's, in Newark; Grace church, and St. Patrick's, in Buffalo; the cathedral of the Immaculate Conception, in Albany; St. Paul's, in Reading, Pa.; Pilgrim church, in St. Louis; in the bell-tower of Cornell university, at Ithaca, N. Y.; and in the college chapel at Amherst, Mass. The half C. and peals in the United States are very numerous. See BELL; BELL RINGING.

**CHIMNEY** (Fr. *cheminée*, Lat. *caminus*). There seems reason to believe that the C., in its present sense of a funnel from the hearth or fire-place to the roof of the house, is a modern invention. In Greek houses it is supposed that there were no chimneys, and that the smoke escaped through a hole in the roof. What the arrangement was in houses in which there was an upper story, is not known; perhaps the smoke was conveyed by a short funnel through the side-wall of the house, which seems to have been the first form of C. invented in the middle ages. The Roman *caminus*, again, was not a C., but a sort of stove; and it has been a subject of much dispute, whether the Romans had any artificial mode of carrying off the smoke, or whether it was allowed to escape through the doors, windows, and openings in the roof. As the climate and the habits of the people both led to the houses of the ancients being very much more open than ours are, it is probable that the occasional fires which they had of wood or charcoal may have given them no great inconvenience. It is known, besides, that the rooms in Roman houses were frequently heated by means of hot air, which was brought in pipes from a furnace below. In England, there is no evidence of the use of chimney-shafts earlier than the 12th century. In Rochester castle (*circa* 1180), complete fire-places appear; but the flues go only a few feet up in the thickness of the wall, and are then turned out through the wall to the back of the fire-place, the openings being small oblong holes. The earliest chimney-shafts are circular, and of considerable height. Afterwards, chimneys are found in a great variety of forms. Previous to the 16th c., many of them are short, and terminated by a spire or pinnacle, having apertures of various shapes.

These apertures are sometimes in the pinnacle, sometimes under it, the smoke escaping as from some modern manufacturing chimney-stalks which are built in the form of an Egyptian obelisk. Clustered chimney-stalks do not appear until late in the 15th c., when they seem to have been introduced simultaneously with the use of brick for this purpose. Each of the earlier clustered chimneys consists of two flues which adhere to each other, and are not set separate, as afterwards was the practice. Long after they were invented, and in use for other rooms, our ancestors did not generally introduce them into their halls, which, till the end of the 15th, or beginning of the 16th c., continued as formerly to be heated by a fire on an open hearth in the center of the hall, the smoke escaping through an opening in the roof known by the name of *louvre*. In many of the older halls in which chimneys exist, they have evidently been inserted about this period.

The action of a C. depends upon the simple principle, that a column of heated air is lighter than a cooler column of equal height; when therefore a flue full of heated air communicates freely by the lower part with the cooler air around it, the greater weight of the latter pushes the warm air upwards, and thus an ascending current is produced. Other conditions being equal, the draught of a C. will thus be proportional to its perpendicular height, and the difference between the temperature within and without it. The straighter and more perpendicular the C., the stronger will be the draught, because the friction of the ascending current will be less, and the cooling effect of a long or tortuous course will be saved. The maximum efficiency of a given C. is attained when all the air that passes up it enters by the bottom of the fire. In this case, its temperature is raised to the uttermost by passing through the whole of the fire, and the fire is at the same time urged to vivid combustion by the blast thus obtained. A powerful furnace may be constructed by connecting a suitable fire-place, capable of being closed all round excepting at the bottom, with a tall C.; and the amount of draught may be regulated by increasing or diminishing the aperture through which the air is admitted to the bottom of the fire-place, or by an adjustable opening above the fire-place, which will diminish the effective draught as its size is increased, or by a combination of both of these contrivances.

When the fireplace can be inclosed thus, there is little liability to descending currents or "smoky chimneys," as they are called, even when the C. is very short, or has a tortuous course. It is chiefly with open fireplaces that this defect occurs, and the means of prevention and cure is a subject of some interest and importance. As with most other evils, the prevention is far easier than the cure; for by properly constructing the C. in accordance with the principles above stated—by placing the opening of the C. as nearly over the fire, and contracting the open space above the fire, as much as possible—downward smoking may in most cases be easily prevented. When a C. is in the neighborhood of a wall or building nearly as high as itself, or—what is still worse—higher, it is apt to smoke on account of the eddies and other complex currents in the air, caused by the interference which such an obstacle presents to the regular movement of the wind. In towns, such tortuous movements of the atmosphere are very common, and the contrivance for preventing the wind from blowing down the chimneys are very numerous, and often grotesque. Revolving cowl of various forms, but alike in having a nearly horizontal outlet, which is so turned by the wind that the mouth shall always point in the direction opposite to that whence the wind is blowing, are the most common, and usually the most effectual. They are generally constructed of sheet-zinc, with an arrow, a flattened pigeon, or other device, as a vane, to determine the rotation of the cowl. The curing of smoky chimneys, in conjunction with the economizing of fuel, was one of the favorite subjects of investigation of that very practical philosopher, count Rumford. He says: "Those who will take the trouble to consider the nature and properties of elastic fluids—of air, smoke, and vapor—and to examine the laws of their motions, and the necessary consequences of their being rarefied by heat, will perceive that it would be as much a miracle if smoke should not rise in a chimney—all hindrances to its ascent being removed—as that water should refuse to run in a siphon, or to descend a river. The whole mystery, therefore, of curing smoky chimneys is comprised in this simple direction: find out and remove those local hindrances which forcibly prevent the smoke from following its natural tendency to go up the chimney; or rather, to speak more accurately, which prevent its being forced up by the pressure of the heavier air of the room."\* He then goes on to speak of above 500 smoking chimneys that he has had under his hands, and which were supposed incurable, and states that he was never obliged, "except in one single instance, to have recourse to any other method of cure than merely reducing the fireplace and throat of the chimney, or that part of it which lies immediately above the fireplace, to a proper form and just dimensions."

By his method, the opening of the fireplace resembles the half of a hexagon, whence it is better adapted for radiation into the room than the former square opening; the fire being brought further forward, has also more heating effect; the space of the fireplace being smaller, the air within it will, with a given sized fire, become hotter, and therefore

\* *Essays: Political, Economical, and Philosophical*, by Benjamin count Rumford, vol. i. p. 299.

have more ascending power; while in the contracted throat widening downwards, and having its sides strongly heated, there is a rapid rush of heated air, which carries the smoke upwards, and resists the passage of temporary down-draughts. Most modern chimneys and fireplaces are now constructed in accordance with count Rumford's suggestions. See GRATE.

One frequent cause of smoky chimneys is the want of sufficient inlet for air to the room. Sand-bags placed under doors, and other devices for preventing ventilation, may cause a well-constructed C. to smoke. Openings must exist somewhere, of sufficient capacity to supply the air which is to ascend the chimney. If the air enters the room on the same side as the fireplace, and sudden gusts of air pass across the front of the fireplace, a temporary descending current is likely to be produced. The openings are best opposite the fire. For the methods of arranging and regulating such openings for the admission of air, see WARMING AND VENTILATION.

Tall factory-chimneys, usually built of brick, are very costly structures, many of them rivaling in height our loftiest cathedral spires. Their construction has been considerably economized by building from the inside, and thus saving the expensive scaffolding. Their walls are built very thick at the base, and gradually thinner upwards: recesses are left at regular intervals in the inside, and stout wooden or iron bars rest upon these to form a sort of temporary ladder for the workmen to ascend; the materials are hoisted by ropes and pulleys. Among the highest existing chimneys are the Townend shaft, Port Dundas, Glasgow, 468 feet, with diameter at base of 32 feet; the St. Pollux shaft, Glasgow, 455 feet, 6 inches; the Fall River Manufacturing Company's shaft, Fall River, Mass., 341 feet; and the Clark Company's shaft, Newark, N. J., 320 feet.

**CHIMPANZEE**, *Troglodytes niger*, a species of ape; one of those which in form and structure exhibit the greatest resemblance to man. It is a native of the warmest parts of Africa; to which also the gorilla (q.v.), a larger species of the same genus, belongs. The C. is sometimes called the black orang; but differs from the orang (q.v.) (*pithecus*) of Asia in the proportionally shorter arms, which, however, are much longer than those of man; in the possession of an additional dorsal vertebra, and an additional or thirteenth pair of ribs; and in other particulars, in some of which it more nearly resembles, and in others more widely differs, from the human species. In both, the difference from man is very wide in the general adaptation of the structure for movement on all-fours and for climbing and moving about among branches, rather than for erect walking, although the C. is able to move in an erect posture more easily than any other ape, usually, however, when so doing, holding its thighs with its hands; and still more in the form of the skull, and consequent aspect of the countenance, the facial angle being as low as 85° in the C. when it is measured without regard to the high bony ridges which project above the eyes; the jaws excessively projecting, and the outline of the face rather concave. There is also an important difference from the human species in the dentition; although the number of teeth of each kind is the same, the canine teeth of the apes are elongated, so as to pass each other, and corresponding intervals are provided for them in the opposite jaw. An interesting point of difference of the anatomy of the C. and orang from that of man, is in the muscle which in man terminates in a single tendon, and concentrates its action on the great toe, terminating in the apes in three tendons, none of which is connected with the great toe or hinder thumb, but which flex the three middle toes; part of the adaptation of the foot for clasping as a hand. The great toe both of the C. and orang is shorter than the other toes, and opposed to them as a thumb.

The C. does not seem to attain a height of quite 4 ft. when in an erect posture. Its skin is thinly covered with long black hair in front; the hair is thicker on the head, back, and limbs. The ears are remarkably prominent, thin, and naked, not unlike human ears in shape. The nose appears as little more than a mere wrinkle of the skin. The thumb of the hand is small and weak, that of the foot comparatively large and powerful. In a wild state, the animal appears to be gregarious, but its habits are not well known. Truth and fable have been so mixed up in the accounts of it that new information must be obtained from reliable sources, before even things not in themselves very improbable can be believed. In a state of confinement, it exhibits, at least when young, considerable gentleness and docility, and readily learns to imitate human actions, in eating with a spoon, drinking out of a glass, and the like; but its intelligence does not appear to be superior to that of many other monkeys, or indeed of many kinds of brutes. Its natural food consists chiefly of fruit and other vegetable substances; in confinement, it exhibits a great fondness for sweetmeats and for wine. The C. is impatient of cold. See illus., MONKEYS, ETC., vol. X.

**CHIMSEYANS**, Indians of the n.w. coast of North America, between 58° and 55° n., including several small tribes. They are noted, like the Indians of Alaska, for disfiguring themselves by inserting a large piece of wood or ivory in the under lip. Their language is said to be sonorous and comprehensive.

**CHINA**. See CHINESE EMPIRE.

**CHINA**, or **CHINA-WARE**. See **POTTERY**.

**CHINA BARK**, a name of cinchona (q.v.) bark, often to be met in books, and in common use on the continent. It is derived, not from the empire of China, but from *kina* or *quina*, the Peruvian name of cinchona.

**CHINA CLAY**, or **KA'OLIN**. See **CLAY**.

**CHINA GRASS**, or **CHINESE GRASS**, the popular name of a fiber used in China for the manufacture of a beautiful fabric known as *grass-cloth*. The name appears to have originated in the belief that the fiber was that of a grass; but this is not the case, it being chiefly obtained from *bahmeria* (q.v.) *nivea*, a plant allied to the nettle. Besides this and other species of the natural order *urticaceæ*, other plants, as species of *corchorus* (q.v.) and *sida* (q.v.) are believed to yield fibers employed in the same manufacture. The fibers are said not to be spun after the European manner, but joined into long threads by twisting their ends together. Grass-cloth is now brought in considerable quantity to Europe, especially in the form of pocket-handkerchiefs. It has a fine glossy appearance and a peculiar transparency.

**CHINANDÉGA**, a t. of Central America, Nicaragua, stands in a fertile plain at the foot of some mountains, about 18 m. n.w. of Leon, and about 10 m. from the Pacific coast. The houses are straggling, of one story, built of adobes, and many of them are inclosed by gardens and plantations. Maize, sugar, cotton, hides, and poultry are produced in the vicinity. It is the capital of a department of the same name. Population variously estimated at from 7000 to 12,500.

**CHINA INK**, another name for Indian ink (q.v.).

**CHINA ROOT**, the root, or rather the *rhizome* (root-stock) of *smilax China*, a climbing shrubby plant, closely allied to sarsaparilla, and belonging to the same genus; a native of China, Cochinchina, and Japan. See **SARSAPARILLA** and **SMILACEÆ**. The stem is round and prickly, the leaves thin and roundish oblong; the rhizome tuberous and large; sub-astringent and diaphoretic. It is occasionally used in medicine, and is imported in a dry state into Europe; but it is also employed in the c. as an article of food. It abounds in starch.

**CHINA TREE**. See **PRIDE OF INDIA**.

**CHINA WAX**, produced by an insect which lives on the ash trees of China. It is scraped from the limbs, melted and strained, when it resembles bees-wax.

**CHINA WEDDING**. See **WEDDING ANNIVERSARIES**.

**CHINCHA ISLANDS**, three small islands in the Pacific, 13° 38' s. and 76° 28' w., 12 m. from the coast of Peru, and 106 m. from Callao. The largest, known as north island, is only about 170 acres in surface. The importance of the islands is owing to their immense deposits of guano. They are of granitic formation, rising from the sea in precipitous cliffs, worn into countless caves and hollows, which furnish convenient resting places for sea-fowl. Their highest point, now 113 ft., was once nearly 90 ft. higher, the whole deposit being of guano. The name of the islands and of the town and valley of Chinchina in the mainland is derived from an ancient Indian race, which has left some interesting relics of its sojourn. A stone idol and two water-pots of grotesque form were discovered under 62 ft. of guano; and a number of wooden idols, two regal emblems, and a curious stone slab have been found. In 1846, the amount of guano in these islands was estimated to be 18,250,000 tons, and in 1852 there still remained 12,360,000 tons. The supply is now quite exhausted.

**CHINCH BUG**, *Blissus leucopterus*, an insect which has sometimes done immense damage to wheat and other crops in the western United States. The female lays her eggs on the ground, and there are often two swarms of bugs in a single year, one in June and one in the autumn. The chinch bug is from a seventh to a fifth of an inch in length; the wing-covers are black, with three or four white dashes, sometimes wanting; the body is usually black, though the unwinged young are at first red, with a white band on the back.

**CHINCHIEW**, or **CHINCHU**, the name of an ancient and famous port of China, in the province of Fuh-keen, 27° 57' n. and 118° 35' east; now termed Changchow. Though occasionally visited by missionaries and others, Chinchu is not one of the treaty ports. **CHINCHU**, or **TSINENCHOW**, is also the name of a district on southeastern coast of China, comprising parts of the provinces of Fuh-keen and Kwang-tung. Its inhabitants are a hardy seafaring people, many of whom enter the imperial navy or man the merchant marine.

**CHINCHILLA**, *Chinchilla*, *Eriomys*, or *Callomys*, a genus of South American quadrupeds, of the order *rodentia*; the type of a family, *chinchillidæ*, allied to *caviæ* (*caviæ*), but differing from them in possessing clavicles. The general aspect is somewhat rabbit-like. There are several genera of *chinchillidæ*, distinguished in part by the number of toes, the true chinchillas having four, with the rudiment of a fifth on the fore-feet, and four on the hind-feet; whilst in the genus *lagidium*, or *lagotis*, there are four on each foot;



and in *lagostomus*, four on the fore-feet and three on the hind-feet. All the species of this family are gregarious; feed much on roots, for which their strong and sharp incisors are particularly adapted; and live either in holes, which they select for themselves in rocky districts, or in burrows, which they excavate. They are valued for their fur, particularly the CHINCHILLA of the Andes (*C. lanigera*), of which the fur constitutes an important article of commerce. Their numbers are said to be sensibly decreasing in consequence of the demand for the fur. The ancient Peruvians were accustomed to employ the wool of the *C.* for the manufacture of fine fabrics. See *illus.*, DEER, ETC., vol. IV.

**CHINCHILLA**, a t. of Spain, in the province of Albacete, 10 m. s.e. of the city of that name. It is situated on an abrupt rocky hill, crowned by a castle, and is surrounded by walls. The town is in general well built, with good streets, and a fine parish church, containing some excellent works of art. It has manufactures of cloth, linen, leather, earthenware, and glass, and a trade in the agricultural produce of the district. Pop. '87, 6096.

**CHINCHON**, a t. of Spain, in the province of Madrid, 25 m. s.s.e. of the city of that name. It is pleasantly situated on a hill near the Tagus, and is well built, with wide, regular, and clean streets. Agriculture forms the chief occupation of the inhabitants, but leather, linen, and earthenware are manufactured to a small extent. Pop. 5000.

**CHINDWA RA**, a t. in the central provinces of India, lat. 22° 3' n., and long. 78° 58' east. It occupies a plateau amid the Deoghur mountains, standing 2,100 ft. above the level of the sea. Its climate is consequently one of the most agreeable and salubrious in India, attracting many visitors in search of health or recreation. Pop. 9000.

**CHINE**, LA, a town in Jacques Cartier co., Quebec, Canada, on Lake St. Louis and the Grand Trunk railroad; 8 miles w. of Montreal. It is a place of summer residence of many citizens of Montreal and a popular winter resort of pleasure parties. A canal, built to avoid the rapids on the St. Lawrence, connects the town with Montreal, and all the water commerce between that city and the west passes through this canal. The town is the starting and landing-place for the Ottawa line of steamers and the Royal Mail line of steamers for Kingston, etc. There are churches, schools, and numerous hotels. The name is now written "Lachine," and was given to the site, it is said, by Cartier, who supposed that at this point in his explorations he must be within easy access of China. Pop. '91, 3761.

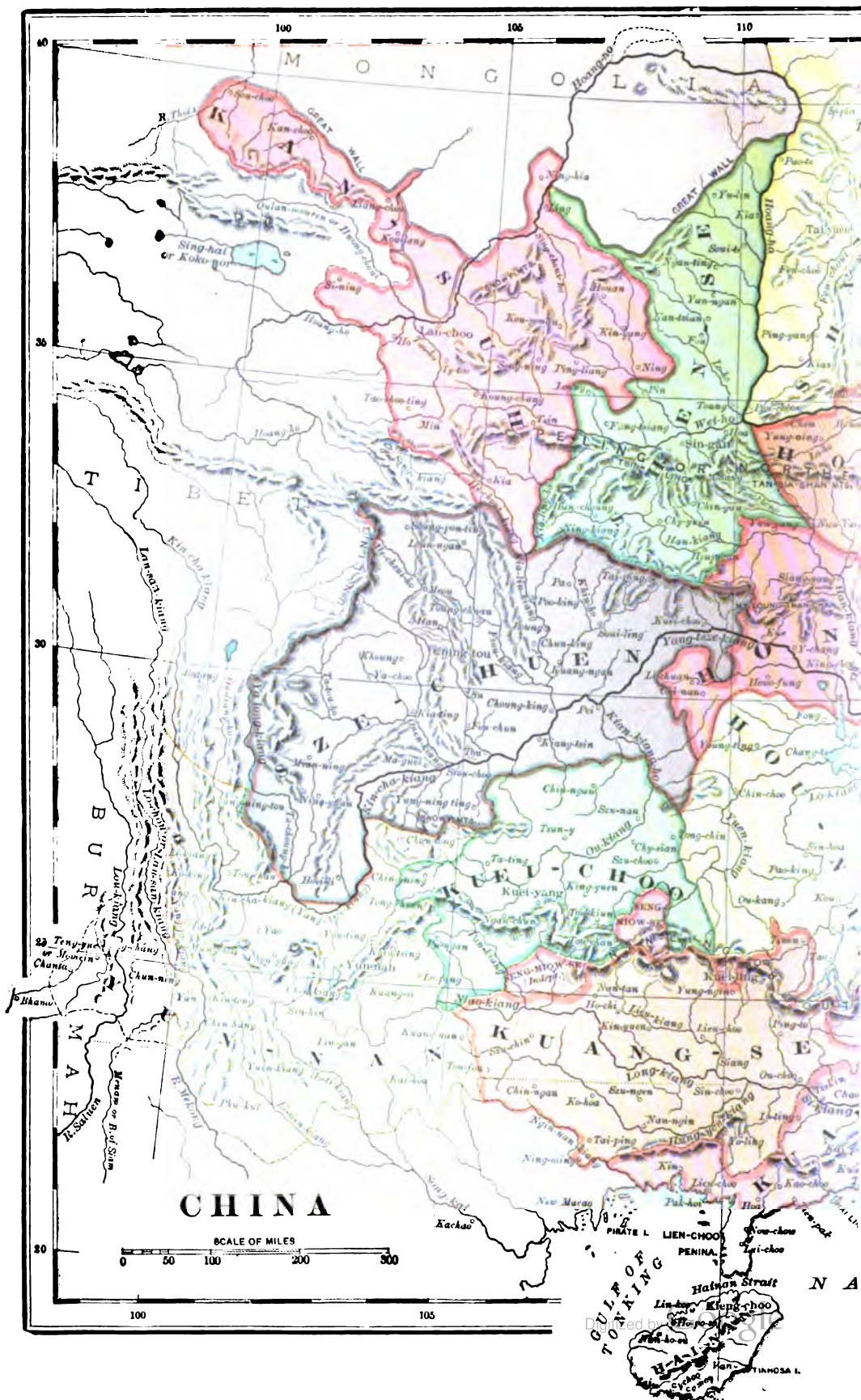
**CHINESE EMPIRE**, a vast territory in eastern Asia, comprehending besides China proper, with its eighteen provinces, the five dependencies of Manchuria (q.v.), Mongolia (q.v.), Thibet (q.v.), Jungaria and East Turkistan. The island of Formosa formerly reckoned as a separate province, but was acquired by Japan in 1895.

*China Proper* occupies the eastern slope of the table-lands of central Asia. In form it approaches to a square, and covers a surface eighteen times as large as Great Britain. It is inhabited by more than 380 millions of the human race, living under the same government, ruled by the same laws, speaking the same language, studying the same literature, possessing a greater homogeneity, a history extending over a longer period, and a more enduring national existence than any other people, whether of ancient or modern times; indeed, when we consider its high antiquity, its peculiar civilization, its elaborate administrative machinery, its wondrous language, its philosophy and classic literature, its manufacturing industry and natural productions, giving rise to such a gigantic commerce with our own land, China is perhaps the most remarkable country in the world, and is worth a closer and more serious study than has yet been generally accorded to it. China proper is included between 18° and 40° n. lat. (which takes in the island of Hainan), and 98° to 124° e. longitude. Its coast-line exceeds 2,500 m. and the land-frontier 4,400 miles. A line running direct n. and s. would give a length of 1474 m.; and another at right angles to this, 1355 m.; but one drawn diagonally from its north-eastern extremity through Yun-nan would measure 1669 miles. The area of China proper is given as 1,336,841 sq. m.; but this measurement, though based on official estimates, must be taken as a mere approximation, and some accounts give it an area of more than a million and a half square miles.

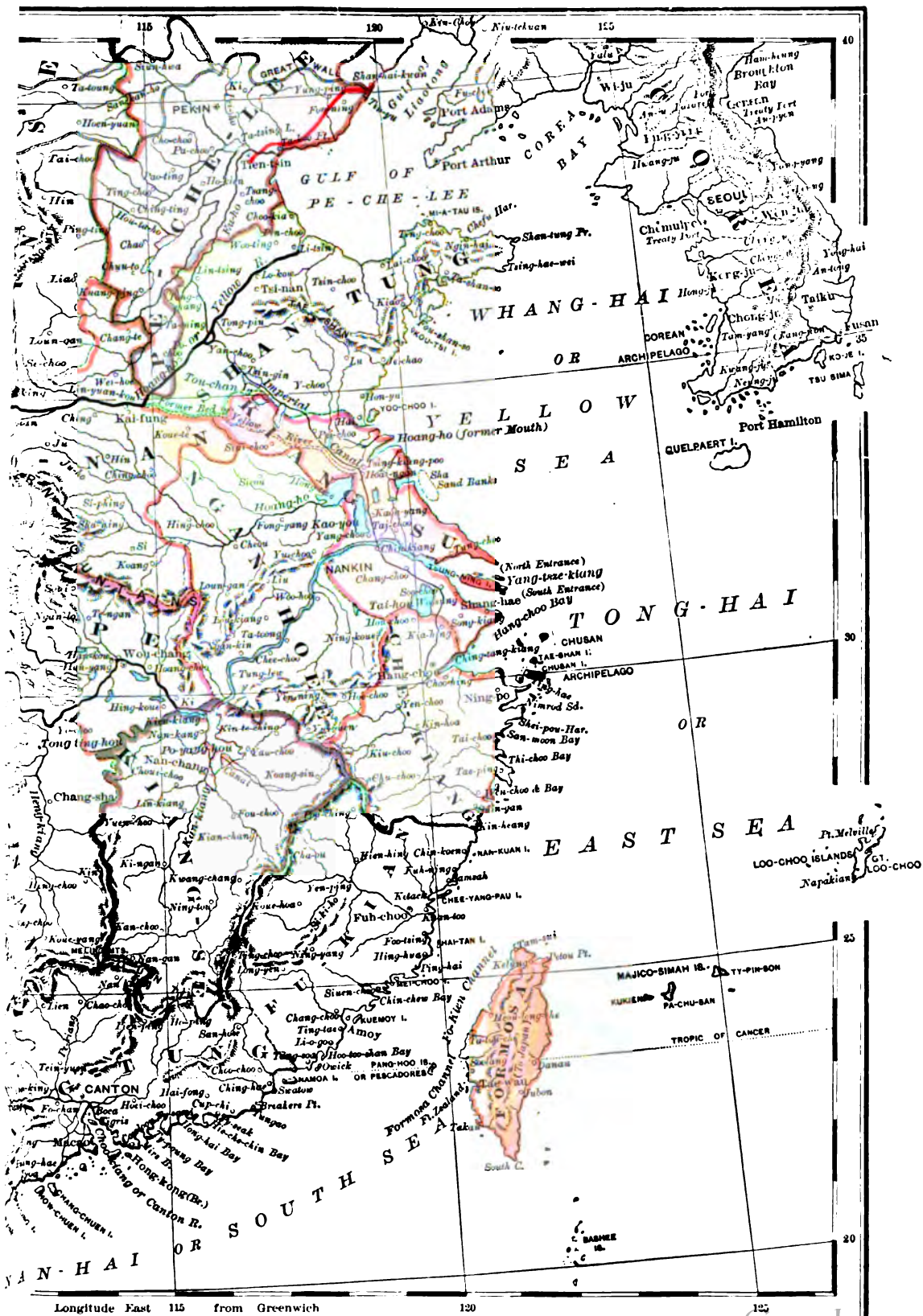
*Physical Features.*—China has a general slope from the mountains of Thibet to the shores of the Pacific. The two principal mountain-chains divide it into three longitudinal basins, drained by those great rivers for which China is famous. Within its provinces are found alluvial plains, fertile river-valleys, large populous towns, as well as thinly inhabited, hilly, and mountainous regions. To describe its surface more particularly, it may be viewed under its natural divisions of mountainous country, hilly country, and the great plain. The first comprehends more than half the region between the meridian 113° and Thibet. East of this meridian, and to the s. of the Yang-tse-kiang river, is the hilly country, which includes the provinces of Fuh-keen, Keang-se, Kwang-tung, and a portion of Hu-nan and Hu-pih; while to the n.e. stretches the great plain. This latter extends from the great wall to 30° n. lat.; a line drawn from King-chow in Hu-pih to Hwae-king on the Yellow River, may be considered its western limit; and the sea forms its boundary on the east. This vast and generally fertile tract has an area of 210,000 sq. miles, and supports a population of 177 millions.

From the mountains of Thibet two grand ranges stretch across China, having a general direction from s.w. to n.e. The more northerly of these—the Tsien-ling or Blue moun-









Longitude East 115 from Greenwich

120

125



tains—are included between the parallels of 31° and 34°. The southern or Nan-ling chain is a spur of the Himalayas. Commencing in Yun-nan, it bounds Kwang-se, Kwang-tung, and Fuh-keen on the n., and passing through the province of Che-keang—where some of its peaks reach the height of 12,000 ft.—enters the sea at Ning-po; thus forming a continuous barrier—penetrated only by a few steep passes, of which the Mei-kwan, or Mei Pass, is the best known—that separates the coast-land of south-eastern China from the rest of the country. This great chain throws off numerous spurs to the s. and e., which, dipping into the sea, rise above it as a belt of rugged islands along the southern half of the Chinese sea-board. Of this belt, the Chusan archipelago is the most northerly portion.

The magnificent *river-system* of China is represented by those noble twin streams, the Hoang-ho or Yellow river, and the Yang-tse-kiang, which, springing from the same water-shed, the eastern mountains of Thibet, are widely separated in their mid course, but enter the sea within 2° of each other. The former has its source in 35½° n. lat. and about 96° e. long.; and after a very tortuous course, empties itself into the ocean in lat. 34°.\* It is a "mighty, impracticable, turbid, furious stream" for the most part, and little adapted for Chinese navigation. But the river most beloved by the Chinese is the Yang-tse-kiang, or "son of the ocean"—more correctly translated, "the son that spreads"—which name is only applied to it by the natives below the commencement of the delta; for above that it is called simply Ta-kiang or Great river. The basin drained by it is estimated at 548,000 sq. miles. Of the other rivers that water the country, the Peiho in the n., and the Choo-keang in the s., are the most noteworthy.

The principal *lakes* of China are five in number—viz., the Tung-ting-hu, in 118° e. long., with a circumference of about 220 m.; the Poyang-hu, in 116° e. long., 90 m. in length by 20 in breadth; the Hung-tsin-hu, in Keang-su; the Tsau-hu, between Nankin-fu and Nankin; and the Tai-hu, in 120° e. long. On these lakes, artificially constructed floating islands, with houses, fields, and inhabitants, animals, and birds, are sometimes seen.

The *Grand Canal* has very greatly facilitated the internal navigation of the country. In the past the great annual grain-fleet, with its 480,000 tons of rice for the use of the capital, passed from the s. to the neighborhood of Peking by this great water-way; thus avoiding the storms and pirates of the coast, but the alteration already mentioned in the course of the Hoang-ho, has rendered it comparatively useless. It connects Tientsin in Chih-le with Hang-chow in Che-keang; though the canal proper commences in Shan-tung, and its total length is about 650 miles.

Another world-famous structure is the *Great Wall*—called Wan-li-chang (myriad-mile-wall) by the Chinese—which was built by the first emperor of the Tsin dynasty about 220 B.C., as a protection against the Tartar tribes. It traverses the northern boundary of China, extending from 84° e. to 15° w. of Peking, and is carried over the highest hills, through the deepest valleys, across rivers and every other natural obstacle. The length of this great barrier is, according to McCulloch, 1250 m. Including a parapet of 5 ft., the total height of the wall is 20 ft.; thickness at the base, 25 ft.; and at the top, 15 ft. Towers or bastions occur at intervals of about 100 yds. These are 40 ft. square at the base, and 30 ft. at the summit, which is 37 ft., and in some instances 48 or 50 ft., from the ground. Earth inclosed in brickwork forms the mass of the wall; but for more than half its length it is little else than a heap of gravel and rubbish.

*Geology.*—The high lands, where are the sources of the great rivers of China, consist of granitic and metamorphic rocks. These are continued round the s. and s.e. of the country, until they leave a huge basin, through which flow the Yang-tse-kiang and Hoang-ho, occupied by fossiliferous strata. The wild and rugged scenery of the larger portion of China is owing to the predominance of those crystalline and sub-crystalline rocks. The fossiliferous strata exhibit representatives of the various formations. The paleozoic rocks are but sparingly developed in a narrow stripe which runs from near Peking in a south-westerly curve, to nearly the center of the empire. Cretaceous rocks occur in the valley of the Yang-tse-kiang. Tertiary beds fill up the eastern portion of the immense basin; while extensive districts to the w. of this region, extending to the crystalline rocks in the extreme w., are covered with modern detritus.

In the northern part of China a peculiar feature of the soil is a formation termed *loess* or land-loam, which is found especially in the provinces of Chih-le, Shan-se, Shen-se, Kan-su, and Ho-nan. It is also found in the peninsula of Leao-tung, in parts of Shan-tung, southern Ho-nan and the vicinity of Tung-ting and Po-Yang lakes. It is a brownish earthy deposit, having considerable fertility, and its depth varies from a few inches to thousands of feet. The action of the weather is apt to wear it away in such a manner as to form terraces and precipices. It is soft and easily washed away from the banks of streams, a fact which accounts for the spreading of the river bed, frequent in the inland waters of China. See the article *LOESS*.

Though no active volcanoes are known to exist, except one in Formosa, yet indications of volcanic action are not wanting. Salt and hot-water springs are found in Yun-

\* The Hoang-ho has recently altered its course, and now enters the sea in a somewhat higher latitude. Such changes, causing losses, and entailing expense, are not unusual; and hence this river has been called "China's sorrow."

nan; sulphur springs near Foochow; and wells of petroleum in Shen-se and Formosa. The most famous amongst the minerals of China is jade or the yu-stone, obtained chiefly in Yun-nan.

Coal is found in all the eighteen provinces, and in its coal resources China may be regarded as one of the first countries in the world. The coal mines of northern Chih-le, worked under foreign direction, have been very productive, and mines have also been opened at Hankow. All the commoner metals are likewise found in China, especially iron and copper. Japanese engineers have been employed in Yun-nan to teach the natives modern methods in copper mining. Near the city of Ning-po are extensive stone-quarries.

**Vegetable Productions.**—The tea-plant (*thea viridis* and *thea bohea*) is the most important vegetable production of China. See TEA. The tallow-tree (*stilingia sebifera*), the *dryandra cordata* or varnish-tree, the camphor-tree (*laurus camphora*) the Chinese pine (*pinus sinensis*), the Chinese banyan (*ficus nitida*), the funeral cypress and the mulberry, are amongst the most important trees of China. The cocoanut and other palms flourish on the southern coast. Of the bamboo, which grows as far n. as lat. 38°, there are 63 principal varieties; and it is said that the bamboos of China are more valuable than her mines, and, next to rice and silk, yield the greatest revenue. The various uses to which they are applied is truly astonishing; and, amongst others, the bamboo is famous as an instrument of punishment. The fruits of both the tropical and temperate zones—apples, grapes, pomegranates, mangoes, pine-apples, three species of orange, the lichi, etc.—are found in the country; and camellias, azaleas, and gardenias are natives of the "flowery land." The *nymphaea*, or water-lily, is greatly prized by the Chinese, both for ornament and in an economical point of view. *Agriculture* is held in higher estimation in China than, perhaps, any other country in the world. The agricultural system of the Chinese is rude, but effective; and every inch of arable land is carefully cultivated. Spade husbandry and irrigation are carried on to a great extent. The Chinese have an appreciation of the value of night-soil as a manure; for, while in other countries thousands of dollars' worth are annually discharged into the sewers, in China it is everywhere saved, bears a high price, and is collected in a manner exceedingly offensive to American notions. In the northern provinces, the cereals are principally maize, barley, and wheat; but in the south, rice is raised in vast quantities, and forms the staple food of the people. Tobacco and the poppy are also raised in considerable quantities.

**Animals.**—Very little is really known of the zoology of China. Some of the more ferocious of the carnivorous animals still linger in the jungles of Yun-nan, and are occasionally found along the whole of the Nanling range of mountains as far as Ning-po, where there is a mart for their skins. Wild-cats are common in the forests of the south, and bears are still found in the hills of Shan-se. Of the ruminantia, there are the musk-deer (*moschus moschiferus*), the moose-deer, and a few other species. The gold and silver pheasant, the argus pheasant, and other gallinaceous birds, hold a prominent place in the ornithology of China. Fly-catchers, thrushes, grackles, and goat-suckers have their representatives in China, and there are several species of crows, jays, and magpies. Water-fowl inhabit the lakes, rivers, and marshes. The larger reptiles are unknown; but tortoises and turtles abound on the coast, and lizards are plentiful in the south. The ichthyology of China is considered to be one of the richest in the world. Sharks, rays, sturgeons, and other cartilaginous fishes, are common on the coast; and the carp formerly was very plentiful in the lakes and rivers. The goldfish has been introduced into Europe from China. Of insects, the arachnidæ are large and numerous; indeed, a tree-spider captures and kills small birds. Locusts often commit extensive ravages. Silk-worms are highly valued, and reared in large numbers.

In a country of such vast extent—extending from 18° to 40° n. lat.—the climate must vary greatly. Indeed, as regards both climate and productions, China may be divided into three zones—the northern, the central, and the southern. The northern zone extends to the 35th parallel, and includes the fine provinces of Shang-tung, Chih-le, Shan-se, Shen-se, and Kan-su. It produces the grains, fruits, and animals of northern Europe. Here the children are red-cheeked, and the extremes of heat and cold are great. In Chih-le, the winters are very severe; and at that season ice a foot thick renders the rivers unnavigable. The natural productions of this and the contiguous northern provinces are wheat, barley, oats, apples, the hazel-nut, and the potato; they are also rich in wood and minerals. The central zone, the richest portion of China, contains eight provinces—Sze-chuen, Kwei-chow, Hu-nan, Hu-pih, Keang-se, Gan-hwuy, Ho-nan, and Keang-su—and is bounded by the 27th or 28th parallel; tea and silk are its characteristic products; the middle portion is the granary of China, and the eastern part is celebrated for its manufactures of silk and cotton. The southern zone embraces five provinces—Yun-nan, Kwang-tung, Kwang-se, Fuh-keen, and Che-keang. The exchange of its tropical productions for those of the northern zone is an important branch of the internal commerce of the country. Kwang-tung lies partly within the tropics; and the whole province is tropical, both in climate and productions.

China has no regular census, and the estimates of its population are various. According to the figures of 1842, the population of the eighteen provinces of China proper and of Formosa was 418,000,000. Other estimates place it as low as 350,000,000. The

following table, taken from the *Statesman's Year Book* for 1897, is based on the official figures for 1882 and 1879, with the exception of Fuh-keen, which is estimated on the basis of the census of 1844.

PROVINCES.	Area : English Square Miles.	Population.	Population per Square Mile.
Chih-le.....	58,949	17,937,000	304
Shang-tung.....	53,702	36,247,835	557
Shan-se.....	56,268	12,211,453	221
Ho-nan.....	66,913	22,115,827	340
Keang-su.....	44,500	20,905,171	470
Gan-hwuy.....	48,461	20,596,288	425
Keang-se.....	72,176	24,534,118	340
Che-keang.....	39,150	11,588,692	276
Fuh-keen.....	38,500	22,190,556	574
Hu-ph.....	70,450	22,190,556	473
Hu-nan.....	74,320	21,002,604	282
Shen-se.....	67,400	8,482,198	126
Kan-su.....	125,450	9,285,377	74
Sze-chuen.....	166,800	67,712,897	406
Kwang-tung with Hainan.....	79,456	29,706,949	377
Kwang-se.....	78,250	5,151,327	65
Kwei-chow.....	64,554	7,669,181	118
Yun-nan.....	107,969	11,721,076	108
<b>Total.....</b>	<b>1,312,326</b>	<b>383,253,029</b>	<b>292</b>

At the end of the year 1895 the customs authorities returned the total number of foreigners living in the open ports of China at 10,091, of whom over 4,000 were British, 1,300 Americans, and the remainder Japanese, Frenchmen, Germans, Portuguese, Spaniards, Swedes, Norwegians, etc. After Peking the largest cities in China are, Canton, Tien-Tsin, Foochow, Hankow, Hangchow-Foo, Ning-po, Amoy, and Shanghai.

*Inhabitants.*—Ethnologically, the Chinese belong to that variety of the human species distinguished by a Mongolian conformation of the head and face, and a monosyllabic language. See CHINESE LANGUAGE, WRITING, AND LITERATURE. A tawny or parchment-colored skin, black hair, lank and coarse, a thin beard, oblique eyes, and high cheek-bones, are the principal characteristics of the race. The average height of the Chinaman is about equal to that of the European, though his muscular power is not so great; the women are disproportionately small, and have a broad upper face, low nose, and linear eyes. Of the general character of the Chinese, it is not easy to form a fair and impartial judgment; and those who have resided long in the country, and know them well, have arrived at very different conclusions. M. Huc asserts that they are "destitute of religious feelings and beliefs," "skeptical and indifferent to everything that concerns the moral side of man," "their whole lives but materialism put in action;" but "all this," says Mr. Meadows, "is baseless calumny of the higher life of a great portion of the human race." He admits, indeed, that these charges are true of the mass of the Chinese, just as they are true of the English, French, and Americans; but as amongst these there is a large amount of generosity and right feeling, and also "a minority higher in nature, actuated by higher motives, aiming at higher aims," so also, he maintains, is there amongst the Chinese a similar right feeling, and a like minority who live a higher life than the people generally. See HIOUEN-TSANG. As regards valor, their annals record "deeds akin to the courage of antiquity;" they have no fear of death, commit suicide as the solution of a difficulty, and endure the most cruel tortures with a passive fortitude; but neither their arms nor discipline enable them to stand before European forces. The Chinese are, as a race, unwarlike, fond of peace and domestic order, capable of a high degree of organization and local self-government, sober, industrious, practical, unimaginative, literary, and deeply imbued with the mercantile spirit. It is to be observed that the inhabitants of China Proper are essentially one people; the differences, except in dialect, being hardly more marked than between the Northumbrian peasant and the Cornish miner. The south-eastern Chinese—the people of Kwang-tung, Fuh-keen, and the south of Che-keang—are the most restless and enterprising in all the eighteen provinces, and may be regarded as the Anglo-Saxons of Asia. In the mountainous districts of the four south-eastern provinces of China, but principally in Kwang-se, are certain tribes who maintain a rude independence, wear a peculiar dress, and are descended from the aboriginal inhabitants of China. Of these, the Meao-tze are the best known.

The *manners and customs* of the Chinese can only here be glanced at. The *worship of ancestors* is a remarkable and prominent feature in their social life, and is dictated by that principle of filial piety which forms the basis of Chinese society. The rich have in their houses a chamber—a kind of domestic sanctuary—dedicated to their forefathers. Tablets, representing the deceased persons, and inscribed with their names, are here carefully preserved; and at stated seasons, prostrations and ceremonies are performed



before them according to the book of rites. All Chinese worship from time to time at the tombs of their parents. In everything that relates to death and sepulture, the customs of the Chinese are no less singular. They meet their last enemy with apparent unconcern; but whilst their future state troubles them little, they regard the quality of their coffins as of vital importance, and frequently provide them during their lifetime; indeed, a coffin is reckoned a most acceptable present, and is frequently given by children to their parents. "To be happy on earth," say the Chinese, "one must be born in Su-chow, live in Canton, and die in Lianchau"—Su-chow being celebrated for the beauty of its women, Canton for its luxury, and Lianchau for furnishing the best wood for coffins. Yet death is never alluded to in direct terms, but indicated rather by periphrases, such as—the person "exists no more," "he has saluted the age," "ascended to the sky," etc. Banquets are offered to the dead, and pathetic speeches addressed to them. In China, *marriage* is universal, and within the reach of all; but there is a strict separation of the sexes, and betrothal is undertaken by the parents or by professional match-makers. Minute ceremonial observances regulate every step, and frequently the bride and bridegroom see each other on the wedding-day for the first time. Women hold a very inferior position, and are little better than slaves. Polygamy is not recognized by law, but secondary wives are common, especially when the first proves barren. Infanticide, though regarded as a crime, is undoubtedly practiced to some extent, as is proved by edicts issued against it; and parents possess almost unlimited authority over their children. The intercourse of the Chinese with each other, especially of the upper classes, is regulated by a tedious and elaborate etiquette; indeed, they are the slaves of custom, and everything is done by precedent. Many curious instances of Chinese politeness might be cited. The well-bred host presses many things on a visitor, which the latter must never dream of accepting. "A Chinaman," says Mr. Oliphant, "has wonderful command of feature; he generally looks most pleased when he has least reason to be so, and maintains an expression of imperturbable politeness and amiability, when he is secretly regretting devoutly that he cannot bastinate you to death." The *Le-king*, or book of rites, regulates Chinese manners, and is one cause of their unchangeableness; for here they are stereotyped, and handed down from age to age. The ceremonial usages of China have been estimated at 8,000; and one of the tribunals at Pekin—the board of rites—is charged with their interpretation. Chinese cookery, in the use of made dishes, more nearly resembles the French than the English. Birds' nests soup, sharks' fins, deer-sinews, and ducks' tongues, are amongst its delicacies. The wine, or weak spirit (*tau*), more correctly speaking, used by the Chinese is made from rice; and from this, again, they distill a stronger spirit, the "samshoo" of Canton. The former is drunk warm in minute cups at their meals; tea never appears during a repast, though it may be taken before or after. The Chinese have numerous *festivals*; and perhaps the most remarkable of these is that celebrated at the commencement of the new year, when unbounded festivity prevails. Preparatory to this, debts are settled, and the devout repair to the temples to gain the favor of the gods. The first day of the year may, in one sense, be reckoned the birthday of the whole people, for their ages are dated from it. Visiting is, at the same time, carried on to a great extent, whilst parents and teachers receive the prostrations and salutations of their children or pupils. The festival of the dragon-boats is held on the fifth day of the fifth month; and at the first full moon of the year, the feast of lanterns. In the manufacture of these the Chinese excel; and on the night of the festival, lanterns illuminate each door, wonderful in their variety of form and material.

In the matter of *dress*, the Chinaman exhibits his usual practical sense, and varies the material according to the season, from cotton-wadded or fur-lined coats to the lightest silk, gauze, or grass-cloth. On the approach of cold weather, he lights no fire in his dwelling, but puts on additional clothing until the desired temperature is attained. A tunic or kind of loose jacket fitting close round the neck, and a wide short trouser, are his principal garments. Shoes are made of silk or cotton, with thick felt soles. White is the color of mourning. The Tartar tonsure and braided queue became general with the Mantchu conquest of the country, since which 180,000,000 of men have the hair removed from their heads at short intervals; and as no Chinaman is his own barber, a great number of this calling find employment. The Chinaman is very sparing in his ablutions, and appears to be afflicted with a strange hydrophobia; for cold water, either as a beverage or for washing his person, he holds in abomination. Long nails are fashionable. The custom of the women differs but little from that of the men, and their shoes are the most remarkable part of their toilet. A lady's shoe measures about  $3\frac{1}{4}$  in. from the heel to the toe. The feet of the Tartar women are left as nature made them; but amongst the Chinese, all young girls of the better classes are crippled by a tyrant custom. In early infancy the feet are tightly bound, the four small toes being tucked under the sole, of which, after a time, they become a part, and the heel is brought forward. The process is at length complete; stumps have been substituted for the ordinary pedal extremities, and the Chinese lady totters on her goat's feet.

The principal *manufactures* of the Chinese are silk, cotton, linen, and pottery, for which latter they are especially celebrated. The finest porcelain is made in the province of Keang-se. The Chinese invented printing in the beginning of the 10th c., and in 983 A.D. a printed imperial edition of the sacred books was published. The skill of the Chinese in handicraft is astonishing. Their rich silks and satins, light gauzes, beautiful embroidery, elaborate engraving on wood and stone, delicate filagree-work in gold and





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CHINESE EMPIRE I.—1. The great wall. 2. A lock on



silver, carvings on ivory, fine lacquered ware, antique vessels in bronze, and their brilliant coloring on the famous pith paper, command our admiration.

**Education.**—As the high road to official employment, to rank, wealth and influence, education is eagerly sought by all classes. Literary proficiency commands everywhere respect and consideration, and there are schools for primary instruction in the remotest villages. Self-supporting day-schools are universal throughout the country and the calling of teacher is followed by a great number of the *literati*, or educated classes. The Chinese have a remarkable reverence for the written character. Waste printed paper is collected from house to house and burned to preserve it from profanation. It is stated that in point of intellect, as well as in business ability and diplomatic skill, the Chinese are the equals of the most civilized races. Yet there are still a vast number of adult Chinamen who cannot read or write, and the study of nature until recent years has been greatly neglected. The native literature reveals very crude notions of animal physiology and medicine, as is shown by a scheme of anatomy which places the heart in the center with the other organs arranged around it. Translations of Western works of science, however, as well as of literature, have recently been introduced and are constantly on the increase. The chief educational institution for this purpose is *Tung wen Kwan*, or college of foreign knowledge, at Peking. This is a government institution which gives instruction in the English, French, German, and Russian languages, mathematics, astronomy, meteorology, chemistry, natural history, physiology, anatomy and Western literature, under the direction of European and American professors. The government provides state examinations which are held annually for literary honors and degrees, these latter being the necessary passports to the public service. In 1887 mathematics were for the first time admitted among the subjects in the examinations. Advanced knowledge is for the most part confined to the special literary class which ranks as the highest in the four social grades. At Shanghai there are a number of colleges under the control of Christian missionaries, and there, as at other ports, are elementary schools in which the English language and the elementary branches of science are taught. Besides these there are government naval and military colleges in connection with the arsenals at Tien-tsin, Nanking, Shanghai and Foochow. Foreign teachers are employed in these institutions for the purpose of inculcating to the young military and naval aspirants the Western science of warfare besides Western language and literature. In several of the treaty ports Chinese newspapers are published.

**Government.**—In the centralized autocratic government of China, the emperor is absolute in the empire, the governor in the province, the magistrate in the district. The emperor claims no *hereditary* divine right, and is not always the eldest son of the preceding monarch; the ablest son is nominated, but his right to the throne as the *Ten-tai*, or *Tien-tze*, "son of heaven," the *Fung-tien*, "divinely appointed," can only be established by good government, in accordance with the principles laid down in the national sacred books. If, on the contrary, he violates these principles, the people firmly believe that heaven signifies, by unmistakable signs, that their ruler is not its chosen representative. "The rivers rise from their beds, the ground sullenly refuses its fruits, the plains tremble, the hills reel, and the typhoon rages over seas and coasts, all alike uttering a 'Numbered, numbered, weighed and parted,' that requires no interpretation, but is read in anxiety by the people, in dismay and terror by the prince," who seeks by repentance and a return to the true principles of the government, to avert his doom. The emperor is absolute as legislator and administrator; but he must legislate in accordance with the general principles acknowledged in the country. He also constitutes, in his own person, the highest criminal court. The Chinese possess a carefully digested code of laws, which is added to and modified from time to time by imperial edicts. Their penal code commenced 2,000 years ago, and copies of it are sold at so cheap a rate as to be within reach of people of the humblest means. Death, which the Chinaman prefers to long confinement, is the penalty for a large number of offenses, and in ordinary years about 10,000 criminals are executed. Several modes of torture are legal. The emperor is assisted in governing by the privy council or grand council. The actual administration of affairs under the emperor is entrusted to the supreme direction of the *Nei-ko* or cabinet consisting of four members, of whom two are Chinese and two are of Manchu origin, besides two assistants from the Great College, who see that the administrative measures are not in conflict with the civil or religious laws of the Empire. Under the direction of these ministers of state are seven boards of government, or executive departments, each directed by two presidents, a Manchu and a Chinese. These boards are—1, the board of civil appointment, which looks after the appointment, salaries, and conduct of the civil officers; 2, the board of revenue, directing fiscal affairs; 3, the board of rites and ceremonies, regulating the customs and laws to be observed by the people; 4, the military board; 5, the admiralty board or naval department; 6, the board of public works; 7, the board of punishment, a high tribunal having criminal jurisdiction. Theoretically superior to all these departments is the court of general inspection, or the *censorate*, as it is called by foreigners. The mandarins composing this, number from 40 to 50; they are "the eyes and ears of the emperor;" for it is their province to see that all officers of the government, provincial or metropolitan, are faithful in the discharge of their duties. One of these censors must be present at the meetings of every one of the government boards and each is privileged to present a remonstrance to the sovereign.

The *administrative machinery* of the Chinese is very perfect in its organization, and demands an attentive consideration for the right understanding of the people, and government. In each of the 18 provinces is an imperial delegate or governor, who, besides being at the head of the civil jurisdiction, is commander-in-chief, and possesses the

power of life and death for certain capital offenses. He is privileged to correspond with the cabinet-council and the emperor. Under the governor are the superintendent of provincial finances, the provincial criminal judge, and the provincial educational examiner; each communicates with his especial board in Peking. The governor is also assisted by many other judicial and administrative officials. The governmental organization of each province is complete in itself, but in a few instances two provinces — Kwang-tung and Kwang-se, for instance — form a viceroyalty, over which a governor-general, in addition to the governors, exercises authority. Every province is again subdivided into districts, departments and circuits. The average number of districts in a province is eighty, and each of these is about the size of an English county. A civil functionary, called sometimes the district-magistrate, presides over this division, and is assisted by several subordinate officers. A group of districts — six is the average number for the whole 18 provinces — forms a department, and is ruled by a prefect, who resides in the *fu* or departmental city. Three departments on an average, constitute a circuit, of which an intendant (*tsoutae*) has the charge.

The several grades of mandarins, or Chinese government officials (Chinese name, *kwun-fu*), are distinguished chiefly by a different-colored ball or button on the top of the cap. There are twelve orders of nobility confined to the imperial house and clan, and also five ancient orders of nobility open to the civil and military servants of the state. The normal government of China is less a despotism than a morally supported autocracy, and it is in principle paternal. What the father is to his family, that the governor, the prefect, and the magistrate are intended to be, each in his own sphere, to the people; whilst the emperor stands in the same relation to the myriad inhabitants of his vast dominions. In ordinary times, the Chinaman enjoys much practical freedom and can travel through the country without passport, or follow any calling he likes.

The Chinese executive system is based on those noteworthy *competitive examinations*, which are intended to sift out from the millions of educated Chinese the best and ablest for the public service. The first examination takes place every three years in the capital of each department, when the lowest degree — that of bachelor — is conferred on a certain number of candidates from each district. Triennial examinations are held in the provincial capital, presided over by two examiners from Peking, at which sometimes as many as 10,000 bachelors present themselves, and compete for the degree of licentiate. Some 1200 obtain it, and these may attend the triennial metropolitan examination at Peking, when about 200 may hope for the coveted degree of doctor, which insures immediate preferment.

Mr. Meadows, the most philosophical, perhaps, of the writers on China, and from whose works the foregoing sketch of the administrative system of the country has been chiefly derived, has entered very fully into what may be termed the *philosophy of Chinese government*, which he sums up in the following doctrines, and believes them to be deducible from the classic literature of the country, and the true causes of the wonderful duration of the Chinese empire. 1. That the nation must be governed by moral agency, in preference to physical force. 2. That the services of the wisest and ablest men in the nation are indispensable to its good government. 3. That the people have the right to depose a sovereign who, either from active wickedness or vicious indolence, gives cause to oppressive and tyrannical rule. And to these he adds an institution — the system of public-service competitive examinations. But, on the other hand, these examinations, by directing the attention of students solely to the ancient literature of the country, to the exclusion of the physical sciences and inductive philosophy, however efficient in producing that wonderful homogeneity for which the inhabitants of the central kingdom are famous, stunt and stereotype the national mind, which, like the dwarfed tree the Chinaman delights to raise in a flower-pot, or the feet of a Chinese girl, can never fully expand.

*Army.*—Each province is provided with an army, but there are no exact statistics of the strength of these provincial forces, nor are the figures for the national forces altogether trustworthy. The latter, according to the Chinese official statistics, are divided into, 1st, the so-called *Eight Banners*, numbering 823,800 men, and including Manchus, Mongols and Chinese, and 2nd, the *Ying Ping* or national army having 6459 officers and 650,000 privates. Another classification divides the Chinese forces into—1st, an active army consisting of (a) the army of Manchuria; (b) the army of the center; and (c) the army of Turkestan; and 2nd, the territorial army. The army of Manchuria is estimated at 70,000 men, many of whom are armed with the Mauser rifle and Krupp cannon. The army of the center is estimated at 50,000 men which can be doubled in time of war. These two are well armed. The army of Turkestan is employed in keeping order in the western territories. Its strength is not accurately known. The territorial army is a sort of militia with a possible war strength of 600,000 men.

*Navy.*—Before the war between China and Japan, 1894-95, the Chinese navy was supposed to be an effective fighting body, but the result of that war showed it to be ill organized and badly commanded. Directed to remain in Chinese waters, it was practically useless, and its efficiency was further impaired by the provincial system of organization. In the battle of the Yalu, one barbette armor-clad and four cruisers were sunk or burned. Afterward one armor-clad was captured and a barbette ship and cruiser were sunk. The characteristic feature of the naval organization is the division of the fleet into squadrons under the command of the provincial viceroys. In 1896-7, as a result of the demoralization caused by the late war, there was practically no effective Chinese navy. The Pei Yang squadron had but two vessels left and the southern squadron had no ships of real value. One torpedo boat, the construction of which was





1



4



5

CHINESE EMPIRE, II.—1. Beggar. 2. Carriage of Chinese official





2



3



6

3. Student. 4. Barber. 5. Group of workmen. 6. Group of children.



ordered before the war, was added and there were in 1896, 7 cruisers of the 2nd class, 4 of the 3rd class, and between 30 and 40 torpedo boats.

**Finance.**—It is difficult to secure accurate data regarding the imperial revenue. A careful estimate in 1899, gave the total governmental receipts (derived from a land-tax, salt-tax and duties) as 79,000,000 taels. Other occasional sources of revenue, however, such as the sale of titles, forced loans, licenses, etc., augment the imperial income. Later estimates of the revenue by Douglass and von Brandt show an increase over 1889, the former placing it at 100,000,000 *haikwan* taels. The value of a *haikwan* tael in United States money as proclaimed by the secretary of the treasury, Oct. 1, 1896, was 80.6 cents. With the exception of the duties on foreign goods, the revenue is collected by the department treasuries, and transmitted to the government only after the deductions for local requirements. It is estimated that not more than one-third of the money collected reaches the national treasury. The Chinese government made public only that part of the receipts which is obtained from foreign customs. This increased from 7,872,257 *haikwan* taels in 1864 to 21,385,389 *haikwan* taels in 1896. A great part of the debt of China is due to the war with Japan. In 1890 the foreign debt amounted to about \$35,000,000. Extensive foreign gold and silver loans were contracted in 1894-5-6, and internal loans were also obtained. The war indemnity with Japan was 200,000,000 taels, and 30,000,000 were added as compensation for the retrocession of the *Leao-tung* peninsula. In 1896 the outstanding foreign debt was estimated at £38,000,000.

**Religion.**—The Chinese, remarkable in so many ways, exhibit, in the matter of religion, their usual eccentricity. Three forms of belief—the Confucian, the Buddhist, and the Taoist—may be considered the national religions, as they are believed in, more or less, by the great mass of the people. Of these, the Confucian and the Taoist are indigenous, but Buddhism was introduced from India. A struggle for ascendancy was long maintained between these religions, but has now entirely ceased; indeed, it is no unusual thing for all three to be professed by the same person, and as they supplement each other, this is not altogether inconsistent. Confucianism is the basis of the social life and political system of the Chinese. It has been professed by all their greatest men, and is still the sole belief of the educated classes. It is, however, less a religion than a philosophy, and does not pretend to treat of spiritual things; hence room was left for other creeds to supply its deficiencies in this respect. The questions to which Confucius replied were: "How shall I do my duty to my neighbor? How can I best discharge the duty of a virtuous citizen?" Funereal temples are erected to Confucius, and though his image is not used as an idol, his tablet is worshiped, and sacrifices of oxen and sheep are offered before it at the vernal and autumnal equinoxes. For an account of Confucius's philosophy, see *CONFUCIUS*.

Buddhism in China, though extending over the whole country, and influencing more or less the mass of the people, is fast losing its hold on them, and has very little of the power and authority it once possessed. Its edifices are going to decay, and no new ones rise upon their ruins. Its priests are illiterate, and together with their religion, are held in contempt by the philosophic Chinaman. Aged people and women are now its chief devotees. The begging-monk is characteristic. He wears a loose yellow robe and large stockings; at his back is a wallet in which to receive the contributions of the faithful; and he gives notice of his approach by striking his *muh-yu*. The northern form of Buddhism, which differs considerably from that of Ceylon and the Indo-Chinese peninsula, prevails in China. Its sacred books, in common with those of Nepal and Thibet are written in Sanscrit, or are translations from that language. Amongst other additions to the creed are the western paradise and the goddess of mercy.

Taoism has not more hold than Buddhism on the literate Chinese. Its priests are generally ignorant men, few of them teaching or understanding the real principles of their faith. They practice a mystic alchemy, prepare spells and incantations, and like modern spiritualists, hold intercourse with the dead. When all other remedies have failed with a sick person, the Taoist priests are sometimes sent for to exorcise the evil spirit that is supposed to afflict the patient; and they chant prayers from their mystic ritual, amid the din of gongs, drums, flutes, etc. These mystics worship certain stars, which are supposed to influence human life, and also genii, devils, and inferior spirits. They live in temples with their families, and are known by their slate-colored robes. For a fuller account of Taoism and its doctrines and founder, see *LAOU-TSZE*.

Besides these three religions, which alone affect the bulk of the people, there is a *ritual state worship*, which regards the emperor and court alone—a kind of philosophic pantheism, an adoration of certain natural objects; but it is a mere ceremonial, and associated with no theological doctrines. Three classes of objects are distinguished, to which the great, medium, and lesser sacrifices are offered. The first-class includes the heaven and earth. Equal to these, and likewise restricted to the worship of the emperor, is the great temple of imperial ancestors. The medium sacrifices are offered to the sun and moon, the gods of the land and grain, genii, and sages. In the third class are reckoned certain natural phenomena, as well as deceased statesmen and scholars. The emperor appears to acknowledge a supreme Being as king of kings, the rewarder of virtue and the punisher of vice; but still, Chinese philosophy, as fixed by Chu-tze, is atheistical, and deduces "the development of the universe from one unintelligent and will-less principle." Hence all educated Chinese are atheists, at least theoretically, as will be found by arguing with them; but when they speak of human affairs generally, and their own particular lot in life, they exhibit a belief in *teen* as a supreme, intelligent, rewarding, and punishing power. There are besides about 300,000 Mohammedans.

Between the followers of the three national religions there is not only a total absence

of persecution and bitter feeling, but a very great indifference as to which of them a man may belong. It arises probably from religious apathy; yet still it is preferable to the fanatical zeal and cut-throat earnestness of the Moslem. Amongst the politer classes when strangers meet, the question is asked: "To what sublime religion do you belong?" and each one pronounces a eulogium, not on his own religion, but on that professed by the others, and concludes, with the oft-repeated formula: "Religions are many; reason is one; we are all brothers." The government is equally tolerant of religious diversity, except where a political design is suspected.

*Temples* belonging to the three religions are very numerous. Those dedicated to Confucius are funeral in character. The Buddhist temples are crowded with images, and Buddha is represented expounding his doctrine to attentive listeners. The many-storied tower takes the place of the bell-shaped dagoba or relic-shrine of other Buddhist countries.

*History and Foreign Intercourse.*—The early annals of China, like those of most other countries, belong rather to mythology than to history. Beginning with Pan-ku, the first of all beings, the country was ruled over first by gods, and then god-descended personages, who revealed to men the essential arts of life. Of those mythical rulers the most famous is Fo-hi. The historical period may be said to commence with the Hsia period or dynasty, begun by Yu the great about 2200 B.C., although a great infusion of the fabulous still continues. Some date the real history of China from the Tchou or Chow dynasty, which began with Wu-wang about 1100 B.C. It was during the reign of Ling-wang (571-544), one of this dynasty, that Confucius was born. China would seem during this period to have been divided into a number of independent states. The kings of Tsin gradually gained the ascendancy, and at last one of them reduced the other states to subjection (247 B.C.), and assumed the title of Hoang, or emperor. It is from the Tsin dynasty that the country has taken its name, Tsina or China. This first emperor finished the great wall (see above), as a protection against the Tartars, who had all along, under the name of Hiong-nu (Huns), been a source of danger and annoyance to the richer and more pacific Chinese. We cannot enumerate the various dynasties that followed, nor the frequent divisions and reunions of the empire, varied by incursions and partial subjugations by the troublesome Tartars. At last, the Mongols or western Tartars, being called in to aid the Chinese (1209), became finally (see KUBLAI KHAN) masters of the whole country (1279), and reigned over it till 1368, when they were expelled by the Chinese, and the Ming native dynasty succeeded, which lasted 276 years, and fell at length through its own misgovernment. A general of the last Ming emperor, employed in keeping the Manchus (see MANTCHURIA) in check, made peace with them, and obtained their assistance against the native usurper who had deposed his sovereign. The Manchus established themselves in Peking (1644), and finally, after a seven years' struggle, acquired the sovereignty of the whole empire. Many of the conquering race now filled the highest offices of state, and owed their position to birth alone. More than one powerful emperor of the race has ably conducted the government of the country; but Hien Fung, who ruled from 1850 to 1861, was reported to have passed his time in a state of drunken imbecility. The late emperor, Tung-chi, succeeded to the throne when only a child five years old, but the government was ably carried on under the co-regency of the empress-dowager, Tze-an, the empress-mother, Tze-sse, and the enlightened prince Kung, brother of Hien Fung. T'ai-tien, cousin of Tung-chi, ascended the throne in 1875. As he was then only about four years old, the empresses continued to act as regents.

Of recent events in Chinese history, the most remarkable is the rise, progress, and overthrow of the Tae-ping rebels. Their famous leader, Hung-sew-tseuen, was a man of humble origin, and an unsuccessful candidate for government employment. Some Christian tracts, it is said, led him to renounce idolatry, and he founded a society of God-worshippers, which, in the autumn of 1850, was brought into collision with the imperial authorities, and immediately assumed a political character. Hung persuaded himself and his followers that he had received a divine commission to uproot idolatry, extirpate the Tartar intruders in the country, and establish the new native dynasty of Tae-ping, or universal peace. He assumed the title of heavenly or divine prince (Tae-ping-wang, sometimes called Tien-wang), and bestowed the titles of eastern prince, western prince, southern prince, northern prince, and assistant prince on five of his chosen leaders. The fanatical principle of divine revelations and other extravagances followed. They spoke of Tien-na, the wife of the Heavenly Father; they held that Tien-wang was the son of God as really as Jesus, and worshiped him accordingly. Polygamy was a dark feature of their system, the Tien-wang himself having married 30 wives. The course of this religio-political rebellion, the victorious march of the Tae-ping army from Kwang-se to Nankin in 1850-53, and its subsequent career, cannot here be traced. We can only afford room to state, that after a series of wasteful and revolting barbarities, it was finally suppressed in 1865 by the imperial troops, led by British and American officers, of whom the most conspicuous and able was col. Gordon. See TAE-PINGS.

In early times, the Chinese do not appear to have been opposed to intercourse with foreigners; but the conduct of the Spaniards and Portuguese between 1520 and 1570 excited their hostility. The Mantchu government restricted British trade and intercourse to Canton, where it was carried on through the medium of the *hong* merchants on the one side, and the East India company on the other. Differences arose, however, from time to time between these two commercial bodies, occasioned chiefly by the exac-

tions of the mandarins on foreign trade. With a view to a better understanding, the British government despatched to Peking an embassy under Lord Macartney in 1792, and another under Lord Amherst in 1816. On the 22d April, 1834, the monopoly of the East India Company ceased, and British imperial officers were appointed to carry out the new judicial and fiscal arrangements. Constant dissensions between these and the mandarins continued till the end of the year 1839, when the latter, under pretense of stopping the opium trade, committed acts of open hostility. A war broke out the following year, at the commencement of which Chinese officials talked of invading England overland, by way of Russia. The imperial government was, however, sufficiently humbled by the middle of the year 1842, and on the 29th Aug., a treaty of peace was signed before Nankin, by which the ports of Amoy, Fu-chow, Ning-po, and Shanghai were, in addition to Canton, thrown open to foreign trade. The island of Hong-kong was ceded to Great Britain, and an indemnity of \$21,000,000 promised by the Chinese.

With five free ports, British trade with China soon assumed gigantic proportions; and though the Chinese evaded the treaty whenever practicable, no important event occurred to interrupt commercial intercourse till 8th Oct., 1856, when the authorities at Canton seized the crew of the lorch *Arrow*, a vessel registered at Hong-kong, and entitled, it was considered, to British protection. Under pressure from the British forces at hand, the imperial commissioner, Yeh, delivered up the men, but refused all apology. Yeh continuing obstinate, Canton was stormed (Dec. 28, 1857) by the allied French and English forces, and the Chinese imperial commissioner captured (Jan. 5, 1858). The government of the city was still carried on by Chinese officials, but under the authority of the plenipotentiaries and commander-in-chief. The former now proceeded to the n. of China, to put themselves in more direct communication with the imperial government, which still continued obstinate. The forts at the mouth of the Peiho were taken (May 20, 1858), and at length an important treaty was signed at Tientsin, June 26, 1858, which stipulates that the queen of Great Britain may (art. ii.) appoint diplomatic agents to the court of Peking, who (art. iii.) shall be allowed to reside at the capital, where also her majesty may acquire a building site. The Christian religion (art. viii.) shall be protected by the Chinese authorities.

By this treaty, the vexed question of transit-dues is settled, it being agreed that the British merchant may purchase at the rate of 2½ per cent *ad valorem*, in the case of imports at the port of entry; and in the case of exports, he may purchase a certificate enabling him to pass his goods, duty-free, to the port of shipment. By a separate clause, the Chinese government agreed to pay two million taels (about £650,000), as indemnity for losses sustained by British subjects at Canton, and a like sum towards the expenses of the war.

The repulse on the Peiho (June, 1859), by a Tartar force concealed in the Taku forts, of the expedition forming the escort of the British and French ambassadors, who were on their way to Peking, to ratify with the emperor of China the treaty of Tientsin, entailed another costly demonstration in the Chinese waters. The Taku forts were captured by the allied English and French forces, Aug. 21, 1860, and Peking itself in Dec., 1860. The treaty of Tientsin was ratified, two additional articles being inserted, one of which legalized coolie emigration. Since 1861, a gradual but beneficial change has come over the spirit of the Chinese government. Prince Kung proved a vigorous and successful regent. The army has been reorganized, and is now subjected to European drill (see *par. army*); a respect for the observance of treaties has sprung up; a national flag has been adopted, and a desire shown on the part of the Chinese to make themselves acquainted with international law. In 1866, arrangements were begun for telegraphic communication between Peking and the rest of the world; and emigration to all other countries was allowed. Shanghai has telegraphic communication with Europe, and some local lines. A railroad between Lutai and Taku was opened in 1888 and two on the island of Formosa. Chinese are now found on almost every shore of the Pacific, where their industry, skill, and sobriety secure them abundant employment. They are especially numerous in the Pacific states of the American Union, where harsh measures, at first including a heavy tax on arriving, were adopted, and later, acts tending to exclude them altogether were passed. In 1894, the conflicting interests of China and Japan in Corea (which was nominally a vassal of China) led to a war between these two great Oriental empires. Hostilities began July 25, six days in advance of the formal declaration of war by Japan; when a Japanese squadron defeated a Chinese fleet and sank a transport carrying troops, and terminated in May, 1895, when, after the invasion by the Japanese of Manchuria, China was forced to make peace to avoid the impending capture of Peking. The terms of the final treaty included the recognition by China of Corea's entire independence, and the payment by China to Japan of a war indemnity of 200,000,000 taels, and an additional 30,000,000 for regaining the Leao-tung peninsula. The effects of the war on trade were felt in 1895 and 1896, the tea trade showing the greatest depression. In Oct. 1896 the plan for the Siberian railway across northern Manchuria was decided upon. For an account of Li Hung Chang's tour of the world in that year see the article LI HUNG CHANG. See also COREA; JAPAN.

*Commerce and Internal Communication.* — The rivers and numberless canals of China are covered with vessels of all sizes, employed in the internal commerce of the empire. The Chinese are devoted to traffic, and the Middle Kingdom is throughout its length and breadth a perpetual fair. In 1876-7 a short railway line was constructed and purchased by the Chinese government. Later a line was built connecting the Kai-ping

mines with the river Petang and this was afterward continued to Tien-tain, and Lin-si. In 1839 the government constructed a railway across the n.w. part of China. Imperial telegraph lines have been rapidly extended and the chief cities of the empire are connected with each other and with Peking. In March 1896, an imperial edict was issued for the creation of a national post-office on western models. The value of China's foreign trade in 1895 was, imports 171,696,715 haikwan taels, and exports 143,293,211 haikwan taels. In the same year the greater part of the Chinese foreign trade was with Great Britain and Hong Kong. Next in importance came Japan, United States, India and Russia. The chief exports were, in order of importance, silk, raw and manufactured tea, straw braid, clothing, sugar, paper, china ware and pottery, and hides, but of these the two first constitute by far the greater part of the exports. Of imports, cotton goods and opium are the chief. During the year 1895 the total number of vessels entered and cleared at Chinese ports was, 37,132, with a tonnage of 29,737,078, of which 19,579 vessels with a tonnage of 20,525,798 were British. The collection of foreign customs is under the management of an imperial customs department, which employs a large staff of European, American and Chinese officials.

There is no coinage in China except the copper *tchen*, or "cash," which is in value about the tenth of a cent, or a mill; and all but the most trifling payments are made by a certain weight of silver, or in Mexican or Spanish dollars. Chinese accounts are kept in taels, mace, candareens, and cash.

The following works (which have been used as authorities in the preparation of this article) may be consulted for further information on China. Meadows's *Chinese and their Rebellions* (Lond. 1856); Davis's (sir J. F.) *China: a General Description of that Empire* (Lond. 1857); Davis's *China during the War and since the Peace* (Lond. 1852); Williams's *Middle Kingdom* (revised ed., New York, 1833); Oliphant's *Narrative of the Earl of Elgin's Mission to China and Japan, in the years 1857, 1858, and 1859* (Edin. 1859); Marquis de Mages's *Recollections of Baron Gros's Embassy to China and Japan in 1857 and 1858* (Lond. 1860); Hue's *Chinese Empire* (Lond. 1858); Cooke's *China in 1857 and 1858*; Fortune's *Three Years' Wanderings in China* (Lond. 1847); Fortune's *Visit to the Tea Districts of China* (Lond. 1852); Edkin's *Religious Condition of the Chinese* (1858); Cobbold's *Pictures of the Chinese by Themselves* (1859); *Twelve Years in China, by a British Resident* (1860); *Mémoires sur la Chine* (1860); Rev. A. Williamson's *Journeys in North China, etc.* (1870); Freiherr von Richthofen's great work, *China* (1877-1880); Boulger's *History of C.* (1881-1884); Douglas, *Society in China* (1894); and Norman, *Peoples and Politics of the Far East* (1895).

**CHINESE EDIBLE DOG.** The kind of dog used as an article of food in China, and reared in order to be so used, being esteemed as a delicacy, is a small dog of greyhound-like form, with somewhat terrier-like head, and muzzle more elongated than in terriers. It is fleet and active, gentle and affectionate. The skin is almost destitute of hair; but one variety has a crest of hair on the head, and a tuft of hair at the tip of tail.

**CHINESE HEMP.** See CORCHORUS.

**CHINESE IMMIGRATION.** See EMIGRATION AND IMMIGRATION.

**CHINESE INK.** See INDIAN INK.

**CHINESE LANGUAGE, WRITING, AND LITERATURE.** The Chinese language belongs to those Asiatic languages commonly called monosyllabic, because each word is uttered by a single movement of the organs of speech, and expresses in itself a complete idea or thing. All Chinese words end either in a vowel, a diphthong (in which, however, each vowel sound is distinctly pronounced, making the word often to appear of more than one syllable), or a nasal. Of such simple words or roots there are about 450. But the emphasis or accent of many of these words may be varied by the speaker in four or five different ways, so as to produce a corresponding variety in their meaning, by which means the number of simple words or roots amounts to about 1200. There is no distinction of parts of speech in the Chinese language, and no recognition of the principle of inflection, Chinese words being incapable of any modification of form. The relations of words are ascertained by their position in a sentence. Hence Chinese grammar is *solely* syntax. Thus *ta*, according to its position in a sentence, at one time serves the purpose of an adjective, meaning "great;" at another, a substantive, meaning "greatness;" and again of a verb, meaning "to enlarge" and "to be great," or of the adverb "very." There are certain words, however, which have at length lapsed into so vague and general a signification, that in conversation and literature they are now used in some cases as particles to determine the relations of other words; but in the older literature this is very rare, and is against the genius of the language. From what has been said, it will readily be inferred that the gender, number, and case of words are not determined by the *form* of the words themselves. They are, in fact, denoted by the addition of other words. Thus, *people* in Chinese is *multitude man*, *son* is *man child*, *daughter* is *woman child*. *The best of men* is in Chinese a *hundred man good*. The purest Chinese is spoken at Nankin, but the same idiom, called "the language of the mandarins," is spoken by the educated in all parts of the empire. For a knowledge of Chinese grammar, see Schott's *Chinesische Sprachlehre* (Berlin, 1857); Summers's *Handbook of the Chinese Language* (1863); Julien, *Syntaxe Nouvelle de la Langue Chinoise* (Paris, 1870); Morrison's *Dictionary of the Chinese Language* (Shanghai, 1865).

In Chinese the written character, generally speaking, does not indicate the sound of the word, but gives a kind of hieroglyphic or pictorial representation of the idea or thing to be expressed. Hence there are required as many of these characters or symbols as there are ideas to be represented. Since many words similar in sound are different in signification, whilst in writing each idea has its peculiar symbol, the number of words represented by writing—without reckoning those peculiar to certain dialects—is perhaps ten times greater than those distinguished by the ear. The number, in fact, is reckoned at 50,000, but these are far from being all in general use. In writing and printing, the characters are arranged in perpendicular columns, which follow one another from right to left.

In its origin, Chinese writing is hieroglyphic or picture-writing, with the addition of a limited number of symbolical and conventional signs; the larger number of Chinese characters are formed by the combination of such hieroglyphs and signs. But as one such character by itself seldom determines the sound, an additional word is conjoined for this purpose; so that the great mass of Chinese written words consist of an ideographic and a phonetic element. Native grammarians divide their characters into six classes. The first class comprises simple pictorial representations of sensible objects, such as sun, moon, mountain, etc., and contains 608 characters. The second class includes such characters as are formed by the combination of two or more simple hieroglyphs, which together convey, in a more or less intelligible manner, some other idea: for example, the hieroglyph for sun, combined with that for moon, conveys the idea of light; mouth and bird, that of song, etc.; of these there are 740. The third class embraces those characters which indicate certain relations of position, as above, below, the numerals, etc.; of these there are 107. The fourth class consists of characters which, by being inverted, acquire an opposite signification, as right, left, standing, lying, etc., and contains 372. The characters of the fifth class are termed derived characters; the meaning of the simple or compound characters used to express physical objects, is transferred to mental objects, or to other physical objects with which they are associated, e. g., the hieroglyph for a heart signifies the soul—that for a room, signifies the wife, etc.; of these there are 598. The characters of the sixth class include those which are composed, as above mentioned, of sign and sound. Almost all names of plants, fishes, birds, and many other objects which it would be difficult to represent hieroglyphically, are denoted by the compound characters of the sixth class, which amount to 21,810 in number. As this class, however, consists merely of repetitions of the other five classes, the immense number of Chinese characters may be reduced to 2,425; and whoever learns these may be said to know them all.

The hieroglyphical characters in their oldest form were easily recognizable figures: thus, the hieroglyph for sun was as in the fig. at *a*; for moon, as at *b*; for light, a combination of sun and moon, as at *c*; for to listen, folding-doors and an ear, as at *d*; for white, a very squint eye, in which hardly anything but the white is seen, as at *e*; for friends, the two valves of a bivalve shell, as at *f*. In the course of time, through hasty and careless tracing, the objects denoted by the hieroglyphs have almost ceased to be recognizable. The modern hieroglyphs corresponding to the above are as represented at *a', b', c', etc.* See Abel Rémusat's "*Mémoire sur l'Écriture Chinoise*," in the *Mémoires de l'Académie des Inscriptions*, vol. viii.; and for a view of the Chinese characters, both ancient and modern, Hager's *Monument de Yü* (Par. 1802).



Chinese Characters.

The Chinese literature, in a geographical, ethnographical, and historical point of view, is unquestionably the most comprehensive and important of the whole of Asia. The printed catalogue of the emperor Kien-long's library is composed of 122 volumes; and a selection of the Chinese classics, with commentaries and scholia, which was begun by the order of the same emperor, is said to comprise 180,000 volumes, of which, in the year 1818, 78,781 volumes had already appeared. In the five canonical or classical books, called *King*, are contained the oldest monuments of Chinese poetry, history, philosophy, and jurisprudence, some portions of which belong, perhaps, to the most ancient writings of the human race. Confucius (q.v.), in the 6th c. B.C., collected them from various sources, and in this collection they have been pretty faithfully handed down to us. Next to these in value are the *Sao-shu*, or the four books. These, as they were written by Confucius and his disciples, must be regarded as the most trustworthy source of insight into the intellectual and political life of the Chinese. A complete and elaborate edition of the five *King* and the four *Shoo* has been undertaken by the great English Sinologue, Dr. Legge, under the title of "*The Chinese Classics*, with a translation, critical and exegetical notes, prolegomena, and copious indexes. In seven volumes;" of which five vols. appeared between 1861 and 1878. A popular edition, under the title of "*The Chinese Classics translated into English*," has also been published, of which vols. i. and ii. deal respectively with the "*Life and Teachings of Confucius*" and the "*Works of Mencius*." Almost contemporary with Confucius lived Lao-tse (q.v.), who was born 604 B.C. He was the founder of a school of philosophy, more spiritual in its character than that of Confucius, but which has

now degenerated into the lowest and most vulgar kind of demonology; see *Le Livre de la Voie de la Vertu*, Chinese and French, by Julien (Par. 1842). In mythology, the Chinese have *The Book of the Mountains and Seas*, *The History of the Gods and Spirits*, and some others. In jurisprudence may be mentioned the universal collection of laws, and the criminal code of the present dynasty; see *Ta-Tsing-lu-li, being the Fundamental Laws and Supplementary Statutes of the Penal Code of China*, by Staunton (Lond. 1810). The Chinese literature is also very rich in works on medicine, natural history, astronomy, agriculture, military science, music, and all branches of mechanics and industry; see *Résumé des principaux Traités Chinois, sur la Culture des Mûriers et l'Éducation des Vers-à-soie*, by Julien (Par. 1837). In philology, the most valuable works are the dictionaries, in which the Chinese characters have been collected and elucidated by examples from the whole treasury of Chinese literature; but the greatest of all works of this kind is the dictionary of the emperor Kang-hi, which is now regarded as the highest authority for the pronunciation and meaning of the characters. Of the encyclopædias of the Chinese, the most conspicuous are that by Ma-tuan-lin (1800 A.D.), called *Wen-hien-thong-khao*—i.e., an accurate investigation of the ancient documents, with rich supplements; and the *Koo-kîn-too-shoo-tse-ching*, or *Complete Collection of Ancient and Modern Books*—of which latter vast work a copy was secured for the British museum in 1877. But the most valuable portions of the Chinese literature are, undoubtedly, their historical and geographical works, which are indispensable to a knowledge of Upper Asia. Sse-ma-thsian (100 B.C.) compiled, from every recognized authority, a work called *Sse-ki*, or historical memorials, which embraces the history of China from the year 2637 B.C. up to the commencement of the dynasty of Han in the 2d c. B.C. This work has been continued by the different dynasties, and forms a complete collection of the annals of the empire up to the termination of the Ming dynasty in 1643 A.D. It is known under the title of *Nian-sul-see*, or the 22 histories. The entire collection of the official annals from 2698 B.C. to 1645 A.D., comprising a period of 4943 years, and consisting of 3706 books, is to be found in the library at Munich.

Amid all their scientific labors, the Chinese have not neglected the art of poetry, in which they possess voluminous collections that have yet to be made known to Europe. In lyrical poetry, the most distinguished names are Li-thai-pe and Tu-su, both of whom flourished at the beginning of the 8th c. A.D.; see Davis "On the Poetry of the Chinese," in the *Transactions of the Royal Asiatic Society*, vol. ii. The romantic poetry of the Chinese, although void of poetic beauty, is valuable for the insight it gives into their domestic life. Their dramatic poetry has laws peculiar to itself, and resembles partly the romantic drama of the Germans, and partly the *comedia delle arti* of the Italians. They have also a kind of novel in dialogues, which forms a subordinate species of drama. Besides the speaking persons or actors, there is what they call a singing person, who introduces into the piece songs which he sings to popular melodies, and appears to correspond in a rude way to the Greek chorus. The best collection of works in this species of literature is the *Yuen-dschin-pe-techong*, i.e., the hundred dramas from the Mongol dynasty (1260-1341), from which all the Chinese dramas known to Europeans have been taken. A Chinese novel, affording a graphic view of the tastes and literary views of that people, was some time ago placed within the reach of European readers by the eminent Chinese scholar Stanislas Julien, under the title of *Les Deux Jeunes Filles Lettrées* (Par. 1860). English readers may also obtain instructive pictures of Chinese life from *Iu-kias-li*, or the Two Fair Cousins, translated from the French version of Rémusat in 1827; and *The Flowery Scroll*, translated, with numerous learned notes, by sir John Bowring, in 1868. But valuable sketches will be found in Schott's *Chinesische Sprachlehre* (1857), Davis's *Chinese Miscellanies* (1865), and Wylie's *Notes on Chinese Literature* (Shanghai, 1867).

**CHINESE SEA**, or CHINA SEA, that portion of the Pacific ocean which has China and Siam on the w., the island of Formosa, on the n., the Philippines on the e., and Borneo on the s., and which forms the great gulfs of Tonquin and Siam.

**CHINESE WHITE**. The white oxide of zinc has recently been introduced into the arts, under this name, as a pigment in place of the preparations of white-lead. It changes very little either by atmospheric action, or by mixing with other pigments; but it has not the body of white-lead.

**CHINGLEPUT**, or CHENGALPAT, the name of a district in India and of the principal town in that district. The district is in the presidency of Madras and has an area of 2842 sq. m. with a pop. in 1891 of 1,137,000. It has about 120 miles of coast, but is ill provided with harbors. Nor is its internal navigation of great value, the only considerable river being the Palar, or Palaur. The town is situated 36 miles s.w. of Madras, and contains a fort built toward the end of the 16th century and now abandoned as a military station. It was captured by Clive from the French in 1752 and besieged by Hyder Ali in 1780-81. Pop. about 6200, 5,800 being Hindoos.

**CHINGTU**, a departmental town in China, capital of the province of Sze-chuen, situated in the middle of a fertile plain watered by several streams. It is connected by telegraph with Hankow and maintains considerable trade in furs, rhubarb, musk, medicines, etc., for which tea, silk and cotton cloth are exchanged. The streets are well laid out and clean, and the houses are well built. Pop. is estimated at 800,000.

**CHINT'**, a village of the Punjab, about a mile from the right bank of the Sutlej, the



most easterly of the five rivers which give name to the country. It is in lat.  $81^{\circ} 81' \text{ n.}$ , and long.  $78^{\circ} 19' \text{ e.}$ , and is 8,770 ft. above the sea. Notwithstanding this elevation, it is a delightful place of sojourn, and was a favorite residence of Lord Dalhousie. It occupies a slight depression on the southern slope of a lofty mountain, which fertilizes the soil with a network of never-falling rills. The neighborhood is remarkable for the size and flavor of its grapes, while the vines, trained over horizontal lattices, afford, while in foliage, a tolerably continuous shelter.

**CHIN-INDIA**, or FARTHER INDIA. See SIAM, BURMAH, COCHIN CHINA.

**CHIN-KEANG-FOO** ("River-Guard City"), a Chinese city and port on the Yang-tze-kiang, at the junction of the grand canal with that river, and about 150 m. from its mouth, was opened to European commerce by the treaty of Tien-tsin (1858), and a British settlement was begun in 1864; and, though its trade developed slowly at first, it has become one of the most important centres of foreign trade in China, the principal articles of export being silk, rice, dried lily-flowers, etc.; of import, opium, cottons and sugar. Natural and artificial water-ways connect it with Shanghai, and its site is very favorable to commerce. It contains a curious cast-iron pagoda 30 ft. high, thought to be 1200 years old. During the Tae-ping rebellion its population was greatly reduced. Pop. '90, about 135,000.

**CHINNOB**, a musical instrument of the ancient Hebrews, with 32 strings.

**CHINON**, a t. of France, in the department of Indre-et-Loire, beautifully situated on the Vienne, 25 m. s.w. of Tours. It has the remains of a huge old castle, formerly the occasional residence of the Plantagenet kings of England, and also of some of the French sovereigns, and celebrated as the place where Joan of Arc commenced her historical career, and as the birthplace of Rabelais. C. has manufactures of druggets, serges, earthenware, etc. Pop. '91, 6119.

**CHINOOKS**, Indians of n.w. North America who once inhabited the region around the Columbia river, in Oregon. They are now nearly extinct. The term Chinookan is applied to a linguistic stock which is divided into the Lower Chinook and the Upper Chinook branches. In general it included the fishing tribes of the n.w. coast. The representatives of this stock are very few in number, and are to be found chiefly on the reservations in Oregon and Washington.

**CHINQUAPIN**. See CHESTNUT and OAK.

**CHIN'SURA**, a t. on the right bank of the Hooghly, about 20 m. above Calcutta, in lat.  $22^{\circ} 53' \text{ n.}$ , long.  $88^{\circ} 23' \text{ east}$ . Pop. along with Hooghly, '91, 33,100. It contains the Hooghly college, and is considered one of the healthiest places in Bengal. It was originally a Dutch settlement, but was ceded in 1824 to the British, along with some other places on the mainland, in exchange for the English possessions in the island of Sumatra.

**CHINTZ**, a highly glazed printed calico, with a pattern in many colors on a white or light colored ground. It is chiefly used for bed-hangings, for covering furniture, and other purposes where gay colors are desired, and where there is much exposure to dust, which does not adhere to its highly calendered surface. See CRETONNE.

**CHIO**. See SCIO.

**CHIOCOCCA**, a genus of tropical and sub-tropical plants, of the natural order *cinchonaceae*, of which two species in particular, *C. anguifuga* and *C. densifolia*, the former a trailing herb, and the latter a bushy shrub, enjoy a high reputation in their native country, Brazil, as cures for snake-bites. An infusion of the bark of the root is certainly one of the most violent emetic and drastic medicines known, its action being accompanied with spasmodic agitations of the whole frame and other symptoms, such as to preclude its use except in the most extreme cases. Yet it had at one time a high reputation in Europe, and was administered in small doses as a diuretic and purgative.

**CHIOGGIA**, or CHIOZZA, an important commercial t. and seaport of northern Italy, in the province of Venice, stands on an island of the same name in the Adriatic, and is connected with the mainland by a stone bridge of 43 arches. The pop., amounting to about 27,100, are chiefly engaged in the coasting-trade, in lace-making, and in ship-building.

**CHION**, OF HERACLE'A, one of Plato's pupils, who sought to liberate his native city by slaying the tyrant Olearchus, but the friends of the tyrant slew the conspirators and the oppression of the people became still greater.

**CHIO'NIS** and **CHIO'NIDE**. See SHEATH-BILL.

**CHIP HATS**. See BRAZILIAN GRASS.

**CHIPMAN**, DANIEL, LL.D., 1785-1850; brother of Nathaniel; educated at Dartmouth college and began law practice in Vermont in 1790. He was a member of the legislature and of congress, and professor of law and jurisprudence in Middlebury college from 1806 to 1816. He was the first official reporter of the decisions of the supreme court of the state, and the author of *An Essay on the Law of Contracts for the payment of Specific Articles*.

**CHIPMAN**, NATHANIEL, LL.D., 1752-1843; a native of Connecticut, educated at Yale, served as a lieutenant in the revolutionary army, and was present at the battle of Monmouth. He was admitted to the bar in 1779, and began practice in Vermont, where he became chief-justice of the state. In 1791, he was a member of the convention called

to decide whether Vermont should join the union, and was one of the commissioners to arrange for the state's admission. Washington appointed him judge of the U. S. court for the district of Vermont. In 1797, he was chosen U. S. senator, and in 1818, he was again elected chief-justice of the state. He was afterward for 27 years professor of law in Middlebury college. Among his published works are *The Sketches of the Principles of Government*; a volume of *Reports and Dissertations*; and *Principles of Government—a Treatise on Free Institutions, including the Constitution of the United States*.

**CHIPMUNK**, the common name of the ground squirrel, *tamias striatus*, especially in the New England and northern states. See **SQUIRREL**.

**CHIPPENDALE FURNITURE** is a particular style of light and elegant drawing-room furniture, inlaid with colored woods, made by Thomas Chippendale, a celebrated English cabinet-maker and designer of furniture, who, in the year 1752, was in business in St. Martin's Lane, London. Almost all mah. gany furniture of the last century is popularly known as Chippendale. Chippendale's designs are delicate and elaborate, though perhaps somewhat overwrought. In 1753, he published a book of designs for furniture drawn by himself. Of this work a second edition appeared in 1759, and a third in 1762. John Weale in 1858-59 issued an elaborate volume entitled *Chippendale's Designs for Seconces, Chimneys and Looking Glass Frames in the Old French Style*.

**CHIPPENHAM**, a parliamentary and muncipal borough in Wiltshire, in a valley on the left bank of the upper part of the Bristol Avon, on the Great Western railway, 23 m. e. of Bristol. It consists chiefly of a well-built street above half a mile long. A bridge of 21 arches crosses the Avon here. C. is famed for its markets of cheese and corn, its cheese market being one of the largest in Britain. There are silk and woolen manufactures, and some mineral springs in the vicinity. Population of borough (1891), 4,618. It returned one member to parliament till 1885. C. was the seat of the Saxon kings of Wessex. About 880, the Danes took it from Alfred, and kept it two years.

**CHIPPEWA**, a co. in n.e. Michigan, on lakes Huron and Superior and the straits of Ste. Marie; 1608 sq. m.; pop. '90, 12,019. The surface is hilly, and mostly covered with pine forests. Co. seat, Sault Ste. Marie.

**CHIPPEWA**, a co. in s.w. Minnesota, on the Minnesota, Chippewa, and Chetomba rivers, reached by the Chicago, Milwaukee, and St. Paul railroad; 575 sq. m.; pop. '90, 8555. Productions, almost entirely agricultural. Co. seat, Montevideo.

**CHIPPEWA**, a co. in n.w. Wisconsin, on the head-waters of the Chippewa river; 1080 sq. m.; pop. '90, 25,143. The surface is varied, and to a great extent covered with forests. Lumbering is the chief business. Co. seat, Chippewa Falls.

**CHIPPEWA**, a village and port of entry in Ontario, Canada, at the junction of the Chippewa with the Niagara river, 2 m. above the great falls. It was here that Gen. Brown defeated the British, July 5, 1814. The Americans had 1900 men, of whom 68 were killed and 267 wounded; the English had 2100 men, of whom 138 were killed and 365 wounded. Pop. '91, 523.

**CHIPPEWA RIVER**, in Wisconsin, rising in the n.w. part of the state and emptying into the Mississippi just below lake Pepin. Its length is about 200 miles.

**CHIPPEWAYS**. See **INDIANS**.

**CHIPPING BIRD**, or **CHIPPING SPARROW**, *Spizella socialis*, a common American bird, 5 or 6 in. long, white underneath, back and sides ash color, with stripes of black and white. Its half-dozen notes of song are repeated with great rapidity.

**CHIQUICHQUI PALM**, *Leopoldinia piassaba*, the **PIASSABA** of the n. of Brazil, and one of the palms which yield the piassaba (q.v.) fiber, now so much used for making brushes. The piassaba fiber exported from Pará is all obtained from it. It grows in swampy or occasionally flooded lands on the banks of the Rio Negro and other rivers of Venezuela and the n. of Brazil; and has a crown of very large, regularly pinnate leaves, with smooth slender stalks. The leaves, like those of many other palms, are much used for thatching.

**CHIQUIMULA**, **ISTHMUS OF**, in Central America, to the s.e. of the peninsula of Yucatan, in long. 89° west. Its breadth from the Caribbean sea to the Pacific is about 150 m.—the greatest elevation not exceeding 2,000 feet.

**CHIQUIMULA**, a department of Guatemala, running from the Caribbean sea along the Honduras border; 4,000 sq. m.; pop. between 60,000 and 70,000. The river Motagua runs through the middle of C. and empties into the gulf of Honduras at San Tomas de Castillo, one of the best ports in Central America.

**CHIKUITOS**, a nation of Indians once very powerful in South America, inhabiting the region w. of Paraguay river. Early explorers described them as an intelligent, war-like, and independent people, living in families, subsisting by agriculture and by the chase, very numerous, and having ample material resources. The Spaniards first invaded their country in 1525, and there were frequent wars with little advantage to the whites. The first permanent white settlement among them was not effected until 1691, when a Jesuit mission was established. The missionaries soon obtained great influence over them, and agriculture and arts prospered, and a considerable trade grew up with the adjoining Spanish settlements. The missions were prosperous until the expulsion of the Jesuits in 1767. Thereafter the Indians rapidly deteriorated, and within a third

of a century following the abandonment of the missions two thirds of the C. nation had disappeared.

**CHIRA'TA**, **CHIRETTA**, or **CHIREETA** (*agathotes chirayta*, also known as *Ophelia chirata*), an officinal plant belonging to the natural order *gentianae*, and possessing properties similar to those of the common gentian, the centaury, and other plants of that order. It is a native of the mountains of the n. of India. The whole plant is intensely bitter, and has been long used in its native country as a tonic and stomachic.

**CHIRICAHUA INDIANS**, a tribe of North American Indians belonging to the Apache family. In 1888, the C. made trouble among the settlers in Arizona and New Mexico and were subdued by General Crook, after a prolonged campaign. They were then placed on the San Carlos reservation, under a government half-civil and half-military, the agency supplying their wants and the military acting as police. The C. are a brave race, whose boast had been that they had never bowed to civilized power.

**CHIRIQUI'**, a name of various application in Central America.—1. A province on the isthmus and in the state of Panama, Colombia.—2. A river flowing towards the n., the lat. and long. of its mouth being about 9° n., and 82° 30' east.—3. A spacious lagoon with three entrances, and with a depth of water for the largest ships, which receives the river.

**CHIROMANCY**, fortune-telling by a study of the human hand (always the left hand), once widely believed in and still practiced to some extent. The points to be observed are the lines, the projections, the joints, the nails, and the contour of the thumb and fingers. The principal line is the *line of life*, running in a curve from the upper joint of the forefinger around the ball of the thumb to the joint of the wrist. If this line shows four distinct and equal furrows near its beginning at the forefinger joint, the person is promised an easy attainment of wealth and honor. If the line be regular and deeply colored, a long and happy life is predicted; if it be freely marked, tortuous and broken, it foretells ill health and short life. If short perpendicular lines run from the line of life toward the palm of the hand, the person may be expected to go on a long journey; if toward the wrist, to be exiled. If the line of life be narrowed but long and strongly colored, it indicates ingenuity and wisdom; a deep line, equally colored, denotes a malicious disposition; and if separated near the center by sharply defined cross lines, it is a sign of approaching death. The next important line is the *line of health*, starting with the line of life and running nearly or wholly across the middle of the hand. If the line be clear and unbroken, it indicates excellence of body and mind; if it be broken and feeble, timidity and ill health are indicated. The *line of fortune*, or *happiness*, is below the line of health, and runs from the base of the fore to the base of the little finger. When this line is distinct and straight it indicates happiness and pleasant temper; if it begins close to the upper side of the hand, it indicates pride; if red in the upper section, envy is foreshadowed; a cross line, so that the two form an upright cross, indicates generosity; if broken and crossed by small lines near the middle, it indicates duplicity. Another line not found in all hands is the *line of the joint*, or *line of the triangle*, extending from the base of the little finger to the middle of the joint of the wrist. When this line is clear, it promises great success after much difficulty. The *mountain of Venus* is the elevation at the base of the thumb, and when smooth and unfurrowed a happy temperament is indicated. The *mountain of Jupiter* is the fleshy projection at the base of the forefinger; that of *Saturn* at the base of the middle finger; that of the *sun* at the base of the ring finger; that of *Mercury* at the base of the little finger, and that of the *moon* is the elevation or bunch on the lower side of the hand. When these mountains are clear and smooth, the indications are: of Jupiter, a heart inclined to virtue; of Saturn, love of labor, and simplicity of character; of the sun, eloquence and vivacious temperament; of Mercury, firmness in men, and modesty in women; and lastly, in the mountain of the moon, a tranquil disposition inclined to melancholy. The lines and shades on the mountains have their significance. Small lines near the little finger, parallel with the line of fortune, indicate happy wedded life, and some say their number foretells the number of children. One more line is called the *milky way*, running downward on the mountain of the moon from the wrist joint toward the little finger; if it be long and clearly defined, it foretells success in studies or in arts or fortune in a distant land. Small white spots under the nails indicate the fulfillment of wishes, at near or remote periods as they are far or near the roots. Aristotle regarded C. as a distinct science; the Roman soothsayers, and even the Emperor Augustus, practiced it; in the middle ages it was studied with alchemy and astrology by the greatest philosophers; the church tolerated it while condemning astrology, or its interference with the doctrine of human liberty.

**CHI'RON**, or **CHEIRON**, the most famous of the Centaurs (q.v.). In the ancient works of art, C. of course appears as half-man, half-animal; but his features, instead of expressing mere savage and sensual strength, as those of the Centaurs generally do, are marked by a mild wisdom, in harmony with the character and deep knowledge attributed to him by the Greek mythologists.

**CHIRONECTES**, a genus of salt-water fishes remarkable for their grotesque forms. The mouse-fish may be taken as a specimen.

**CHIROSOPHY.** See CHEIROMANCY.

**CHIROPTERA.** See BAT.

**CHI'BU**, *Antelope Hodgsoni*, a species of antelope, inhabiting the pine forests and elevated open plains of Thibet, in regions bordering on the limits of perpetual snow. It is much larger than the chamois, being about 5 ft. in length, and the height at the shoulder about 3 ft. The C. lives in great herds, and seems to exceed almost all the other gregarious ruminants in watchfulness against the approach of danger. Sentinels are constantly posted to prevent surprise.

**CHISA'GO**, a co. in e. Minnesota, on the Wisconsin border; 435 sq. m.; pop. '90, 10,359. It is intersected by the St. Paul and Duluth railroad. The principal productions are wheat, corn, oats, hay, and butter. Co. seat, Center City.

**CHISELHURST**, a parish in Kent, England, 11 m. s.e. of London. It was here that Napoleon III. fixed his residence in 1871, and died Jan. 9, 1873. His widow, the empress Eugenie, dwells in Chiselhurst (1891).

**CHISHOLM**, CAROLINE (JONES), b. England, 1810; a noted philanthropist who settled in Australia in 1838 and founded at Sydney schools and asylums for destitute girls. In 1841-45 she procured employment for more than 11,000 persons, and lent in small sums about \$6,000, of which all but \$120 was returned. In her honor the people of Sydney founded the "Family Colonization Society." She d. 1877.

**CHIS'WICK**, a village in the center of Middlesex, 7½ m. s.w. of St. Paul's, London, on the left bank of the Thames. Pop. '91, 21,964. Around C. are many fine villas, extensive market-gardens, to supply London, and the gardens of the London horticultural society. The churchyard contains the grave of Hogarth, and the Duke of Devonshire's beautiful villa, Chiswick House, is situated here. See Harper's Magazine, Aug., 1888.

**CHITIN** forms the skeleton of all insects and crustaceans. In insects, it constitutes not merely the external skeleton, the scales, etc., but also forms their tracheæ, and thus penetrates into the most remote portions of their organs; indeed, one of the layers of their intestinal canal consists of chitin. Hence, we can make good preparations of these parts by treating insects with a solution of potash, which dissolves all but the C.: in this way, we can microscopically examine the most delicate parts, as, for instance, the valves of the tracheal openings.

In a state of purity, it is a white amorphous body, which usually retains the form of the tissue from which it is prepared. It has been analyzed by C. Schmidt, Lehmann, and other chemists. Schmidt considers that its composition is represented by the formula  $C_8H_{11}N_2O_{10}$ . The best method of obtaining C. is by boiling the elytra of the cockchafer with water, alcohol, ether, acetic acid, and alkalies. The substance left after these respective boilings is pure chitin. It seems to be identical with the substance termed by Lassaigne *entomaderm*.

**CHITON**, a Linnæan genus of mollusks. Linnæus, regarding merely the shell, placed them in the class of multivalves, a class entirely artificial. They are now regarded as constituting a family (*chitonidae*) of gasteropodous mollusks, of the order *cyclobranchiata* of Cuvier, and as occupying a place in systematic arrangement close to limpets. The shell is composed of eight narrow, transverse, calcareous pieces, overlapping each other in a row along the back, and strongly attached to the mantle, which is remarkably fleshy and fibrous. They have the power of rolling themselves up into a ball. The organ of locomotion is an oval foot, more or less wide, according to the species, and extending the whole length of the animal. More than 200 species are known; they occur in all climates, most abundantly on rocks at low water, but some of them at great depths. Some of them creep along the sand. All the British species are small; but some foreign ones grow to 3 or 4 in. in length. The fry of these mollusks swim about by means of long vibratile cilia.

**CHITTAGONG**, a maritime district in Lower Bengal, taking its name from its capital below mentioned. It is bounded on the s. by Arracan, and on the w. by the bay of Bengal, and stretches from lat. 20° 45' to 23° 25' n., and from long. 91° 32' to 93° east. It has an area of 2,563 sq. m.; with a pop. (1891) of 1,290,000. C. (properly *Chittagráh*) also gives name to a *division*; area, 12,118 sq. m.; pop. '91, 4,190,000. In the forests of C. large numbers of elephants are annually caught.

**CHITTAGONG**, or ISLAMABAD (the second name having been conferred by Aurungzebe, who captured it towards the close of the 17th c.), a city of India, standing on the Kurrumfull, about 7 m. from its mouth, in lat. 22° 20' n., and long. 91° 54' east. It came into possession of the British, along with Bengal proper, in 1760-65. But having originally formed part of Arracan, it was claimed, after a lapse of sixty years, by the Burmese emperor as a dependency of that territory—a claim which formed one of the grounds of the war of 1824. Through the results of that contest, C. diminished in importance, but some European merchants began to settle there in 1864, and its prosperity is returning. It has a considerable export trade in rice, jute, gunny and tea. Population, '91, 24,100.

**CHITTAGONG HILL TRACTS**, a district on the e. frontier of British India, 5,419 sq. m.; pop. '91, 107,000, among whom were only a small number of Christians. The region is hilly, with deep ravines and prominent cliffs, covered with gigantic creeping plants. The crops are rice, corn, tobacco, and cotton.

**CHITTAGONG WOOD**, the wood of *chickrassia tabularis*, a tree of the natural order *cedrelaceae*, a native of the mountainous countries to the e. of Bengal. In some parts of India it is called *cedar* or *bastard cedar*, names, however, which are also given to other kinds of wood. C. W. is much valued in India, and is used for all purposes for which mahogany is used in Britain. It makes beautiful and light furniture, but is apt to warp in very dry weather. Beautifully veined and mottled pieces are occasionally met with, and are highly valued.

**CHITTELDEOOG**, or **CHITRADURG**, a t. in British India, in the province of Mysore, 280 m. w.n.w. of Madras. It is in a fertile plain, and was once one of the strongest places in India. The present fortress crowns a high rock in the rear of the town, and is a formidable defense. Hyder Ali besieged C. in 1776, getting possession eleven years later, but then only through treachery.

**CHITTENDEN**, a co. in n.w. Vermont, on lake Champlain; 516 sq. m.; pop. '90, 85,889. It is drained by the Winooski and Lamoille rivers, and traversed by the Central Vermont, and the Rutland railroads. The productions are wheat, corn, oats, potatoes, hay, cheese, butter, wool, and maple sugar. Co. seat, Burlington.

**CHITTENDEN, MARTIN**, 1766-1840; son of Thomas; a graduate of Dartmouth college, and for many years in judicial offices in Vermont. He was chosen to congress in 1803, and four times thereafter; and was governor of the state from 1818 to 1815.

**CHITTENDEN, THOMAS**, 1780-97; the first governor of the state of Vermont, b. in Conn., where he was a member of the legislature. In 1774, he settled in Vermont, and participated in all the political action of the people in councils and conventions, until the territory became a state, before and after which period he was the governor.

**CHITTIM, KITTIM**, the Phœnician name for the island of Cyprus. It was also known to the Jews under this name (Numbers xxiv. 24). Its chief town, Kitron, was an important slave-trading emporium for the Phœnicians.

**CHITTOE**, the name of two fortified towns in India.—1. C. in the district of Arcot, about 80 m. to the w. of Madras, in lat. 13° 12' n., and long. 79° 9' east. It stands on the s. or right bank of the Puni, an affluent of the Palar, and is about 1100 ft. above the sea. Its river varies, according to the season, from a small rivulet to an expanse of 400 yards in width. When the stream is at its lowest, the very tanks, as well as the deserted channel, become little better than slime—the result being fever, ague, dysentery, and other diseases. The thermometer has occasionally reached 140° in the sun; but the annual range in the shade runs from 56° to 100°.—2. C. in Odeypoor, or Mewar, about 370 m. to the s.w. of Agra, in lat. 24° 52' n., and long. 74° 41' east. The fortress occupies the summit of an isolated rock of nearly 6,000 yards in length, and of 1200 in breadth, which is scarped all round to a depth of 80 or 100 feet, about a fourth part of its entire altitude. Within the inclosure are several antique structures—such as temples, tanks, a palace, commemorative pillars, and an inner citadel.

**CHITTY, JOSEPH**, 1776-1841; a lawyer of England whose text-books have been considered almost necessary for students and young practitioners. The chief of his works are, *Treatise on the Parties to Actions and to Pleadings*; *Treatise on the Law of Nations relative to the Legal Effects of War on the Commerce of Belligerents and Neutrals*, and *on Orders in Council in Licenses*; *Political Treatise on Criminal Law*; and *Synopsis of Practice in the King's Bench and Common Pleas*.

**CHIUSA LA**, a town in the province of Palermo, Sicily, 80 miles s.w. of the city of Palermo. It lies on the slope of some hills and was built in 1820. Oil is produced, and fruits and sumach are cultivated. Pop. 7100.

**CHIUSI**, a t. of central Italy, province of Siena, 87 m. s.e. of Siena, with a pop. of 2,000, stands on an eminence in the Val di Chiana, not far from the lake of the same name. In ancient times, under the name of *Clusium*, it was one of the twelve republics of Etruria, and the residence of Porsena (q.v.). When Italy was overrun by the barbarians, C. fell into decay, the whole valley was depopulated, and became the pestilential pool described by Dante. Since the improvement of the course of the Chiana (q.v.), C. has begun to flourish again along with the whole district. But it is in connection with the discovery of Etruscan antiquities that C. is chiefly heard of. Within the last quarter of a century, immense quantities of these remains have been found in the neighborhood in the grottoes that served the ancient Etruscans as tombs. There are three museums in C. filled with them, and a great number are in the public gallery at Florence. They consist chiefly of sun-dried earthenware vases, black, and partly covered with mythological figures. Excavations still continue to be made, but discoveries have become rarer of late years.

**CHIVALRY** (Fr. *chevalerie*, from *chevalier*, a knight or horseman), the system of knighthood, together with the privileges, duties, and manners of knights. The social arrangement to which this term is applied seems first to have assumed the character of a positive institution during the 11th c.; but so far from being an invention of that period, it had its roots in the manners of the Germanic races, amongst whom it ultimately arose, at the earliest period at which they are historically traceable. In the description which Tacitus has given us of the manners of the Germans, we find the most unequivocal indications of the existence, not only of the general spirit, but, in a partially developed form, of many of the special arrangements of chivalry. But it was in connection with feudality that C. attained to its full proportions, and in many respects it must be regarded as the complement of that institution. See **FEUDAL SYSTEM**. Whilst feudality exhibits the political, in C. we see the moral and social side of the arrangements of mediæval life. It was in the feudal mansions of the barons that the system was developed; and to the lay portion of the youth of the higher classes, the instruction which they there received in the usages of C. formed by far the most important part of education. In addition to the martial accomplishments, which corresponded to those of a modern cavalry-officer, they were instructed in the political relations which subsisted between the vassal and his lord, by which the whole body of society was then bound together; and in what might almost be called a system of ethics, strangely enough exhibiting unmistakable traces of the stoic philosophy. The analogy between the severer virtues recommended to the special cultivation of their disciples by the followers of Zeno, and those inculcated on the novice in C., and practiced by the knights of the middle ages, might be ascribed to other than historical causes, were it not that we are able to trace the connection between them with something approaching to certainty. If any one wishes to convince himself of the truth of our assertion, let him compare the last production of the intellectual life of antiquity with one of the earliest and most important of our own literature, the *Consolations of Philosophy* of Boethius with Chaucer's *Testament of Love*. The resemblance is so close, that the latter work has, not without reason, been regarded as an imitation of the former; but the main features which distinguish them, and mark Chaucer's work as belonging to the modern world, are more instructive than even their similarity. The place which Philosophy, the celestial consoler, occupies in the work of Boethius, in that of Chaucer is supplied by *Love*—a being whom we must in nowise confound either with the heathen goddess, or, as some have done, with the divine love of the Christian religion. She is neither more nor less than the embodiment of an abstract idea which formed the central point of the whole system of C.; and her substitution for the philosophy or reason of Boethius is very characteristic of a state of society in which the affections and passions, rather than the intelligence, were the motive principles. The "Love" of Chaucer is a complete generalization, altogether independent of individual object, and the consolation which she proffers to her votary is that of enlisting in his favor the special guardian, the "Margarite," who is supposed to watch over his individual fortunes. The "Margarite" seems to correspond to the chivalrous idea of the *Lady-love*, in its purest sense, when its reference to a person was by no means indispensable, but when it signified rather "the love of woman," the highest object of the knight's ambition. Under the protection of this guardian spirit, the lover is represented as altogether sheltered from the caprices of fortune, and in her name he has a dose of rather frigid comfort administered to him, greatly resembling that which Boethius receives at the hands of Philosophy. Such is the general idea of the book, and it is a noble idea, embracing the very essence of society as it existed then, and presenting a much deeper view of that singular institution C. than is usually to be met with in writers who have not been actually brought in contact with its influences. But to the two elements which we have mentioned as ingredients in the spiritual life of C., the Germanic traditions on the one hand, and those of classical antiquity on the other, a third falls to be mentioned, which was, perhaps, the most important of all—that of Christianity as represented by the church. The clergy were too fully aware of the importance of early impressions, not to seize on the imagination of the aspirant to C. at the all-important moment of his inauguration. The purifications, prayers, and vigils, the sacrament and the vows by which this solemn rite was accompanied, are detailed elsewhere (see **KNIGHT**, **BANNERET**, **BATH**, etc.); and their influence in casting a religious character over the whole institution of C., and occasionally in directing its energies specially to the propagation of Christianity, by means of the various religious orders of knighthood and the crusades, is well known. Nor was the poet behind the priest in availing himself of the influences of C., and developing them in the region of the imagination. What Chaucer has exhibited in the work to which we have referred, may be regarded rather as the philosophical than the poetical side of the institution. But to poets of a lighter and more imaginative cast of mind, C. has furnished, from the days of the troubadours down to the present poet-laureate, no insignificant portion of their subject-matter. King Arthur and his knights of the round table, the traditions regarding whom had been taken from a period altogether mythical, and long anterior to the existence of C. as an institution, became to the poetry of the middle ages very much what the heroes of the Trojan war were to that of the whole ancient world. Much astonishment has often been expressed at the contrast between the lofty and ideal purity of the code of morals inculcated by C., and the gross

ness of the lives of the men who were trained under its influences. The case is one which in a remarkable degree proves the practical importance of the inculcation of sound doctrine, for the practice gradually, though slowly, conformed itself to the principles; and it is probably in no insignificant degree to the elevated tone of the latter that we owe the moral superiority of the modern over the ancient world.

**CHIVALEY**, COURT OF, a military court, established by Edward III., of which the earl marshal and the lord high constable were joint judges. When held before the earl marshal alone, it was merely a court of honor; but when both were present, it was also a criminal court. Having encroached on the common law, its jurisdiction was defined by 18 Rich. II. stat. i. Under this act, the court claimed power to give relief to such of the nobility and gentry as think themselves aggrieved in matters of honor, and to keep up the distinctions of degrees and quality. In criminal cases, a jury was sworn; but in general the proceedings of the court were summary matters, being brought under its cognizance by complaint or petition. An attempt was made to revive the functions of the court in Queen Anne's time; but, except as represented by the earl marshal's court (see **HERALDS' COLLEGE**), it has now gone into abeyance.

**CHIVAS'SO**, a small city of Piedmont, northern Italy, situated in a fertile plain on the left bank of the Po, about 15 m. n.e. of Turin. It was formerly a place of considerable military importance, but its fortifications were destroyed in 1804 by the French. The lampreys of C. are celebrated throughout Piedmont. It has manufactures of bricks, earthenware, soap, etc., and a trade in the agricultural produce of the district. Pop. about 9000.

**CHIVE**, or **CIVE**, *Allium schoenoprasum*, a plant of the same genus with the leek and onion (see **ALLIUM**), a perennial,  $\frac{1}{2}$  to 1 foot in height, with very small, flat, clustered bulbs, increasing by its bulbs so as to form a sort of turf. The leaves are tubular, cylindrical-tapering, radical, nearly as long as the almost leafless flowering-stem, which is terminated by a hemispherical, many flowered, not bulbiferous umbel of bluish red, or, more rarely, flesh-colored flowers. The stamens are included within the perianth. This rather pretty little plant grows wild on the banks of rivers, and in marshy or occasionally flooded places in the middle latitudes of Europe and Asia. It is a rare native of Britain. In some of the mountainous districts of Europe a variety is found, larger and stronger in all its parts, and with flowering-stems more leafy. Chives—the name is generally used in the plural—are commonly cultivated in kitchen-gardens, often as an edging for plots, and are used for flavoring soups and dishes. Their properties are very similar to those of the onion. The part used is the young leaves, which bear repeated cuttings in the season.

**CHIZEROTS AND BURINS** form one of those peculiar races in France that live isolated in the midst of the rest of the population, and are despised and hated by their neighbors. They live in the arrondissement of Bourg-en-Bresse, in the department of Ain; and the communes of Sermoyer, Arbigny, Boz, and Ozan belong to them. According to tradition, they are descended from the Saracens. Although industrious and prosperous, they are held in the utmost contempt and detestation by their peasant neighbors, who are often indolent and destitute. They are looked upon as covetous and malicious, and scarcely would the daughter of a small farmer, or well-to-do day-laborer, become the wife of one of them, so that they mostly marry among themselves. From time immemorial, the C. and B. have been field-laborers, cattle-dealers, butchers, etc. Many of them are very good-looking. The young women are handsome, clear-complexioned, with large black eyes. See Michel, *Histoire des Races Maudites de la France et de l'Espagne* (2 vols., Par. 1847).

**CHLADNI**, ERNST FLORENS FRIEDRICH, founder of the science of acoustics, was b. at Wittenberg, Nov. 30, 1756. He studied law in his native place, and also in Leipsic, where, in 1783, he was made doctor of laws. C. ultimately abandoned judicial studies altogether, devoted his mind to natural science, and, being acquainted with music, was led to observe that the laws of sound were by no means so well established as those of other branches of physics. He therefore began to apply his knowledge of mathematics and physics to acoustics, and traveled for 10 years (after 1802) through Germany, Holland, France, Italy, Russia, and Denmark, giving lectures on the subject, which were very successful. He died in Breslau, April 3, 1827.—C.'s writings include *Discoveries concerning the Theory of Sound* (1787); *Acoustics* (1802); *New Contributions to Acoustics* (1817); and *Contributions to Practical Acoustics, with Remarks on the making of Instruments* (1822). C. also wrote several essays on meteoric stones.

**CHLAMYDOSAU'RUS**, a lizard of Australia, which has on its neck a singular mantle or plaited frill covered with scales and edged with spines. When full grown, this lizard is nearly 3 ft. long.

**CHLAMYPH'ORUS** (Gr. *chlamys*-bearing; *chlamys*, a soldier's cloak), a very remarkable genus of mammalia of the order *edentata*, ranked by naturalists in the same family with the armadillos, but differing in important respects from them, and from all other known quadrupeds. Only one species is known, *C. truncatus*, 5 or 6 in. long, a native of the interior of Chili, living underground like the mole, which it much resembles in its habits, and feeding on the same kind of food. Its forefeet are adapted for digging,

although in a different manner from those of the mole. The skull is destitute of sutures; there are resemblances to the osteology of birds in the ribs and their union to the sternum; the hinder part of the body is altogether unlike that of any other known animal, in its terminating quite abruptly, as if cut off almost where its thickness is greatest, or as if the back were suddenly bent down at right angles, the tail not springing from where the line of the back appears to terminate, but far below. The whole upper and hinder parts of the body are covered with a coat of mail, made up of a series of square plates; the under parts and legs are covered with long silky hair.

**CHLAMYS**, an outer garment worn by the Greeks and some other people of the east. It was of wool, smaller than the more common blanket, of finer material, and often of brilliant colors. It was an oblong square, twice as long as its width. The wearer fastened the corners of the shortest side to the middle of the chest, the chlamys falling down over the back to the knees; or when fastened on the right shoulder it fell over the left arm and side. The chlamys for women often had a fringe or border of rich colors.

**CHELOPICKI**, JOSEPH, a Polish general, and dictator of Poland during the revolution of 1830, was b. in Galicia in 1771. He entered the army in 1787, attracted the notice of Kosciuszko during the first insurrection of the Poles, and after the storming of Praga, 9th Nov., 1794, when the hopes of the patriots were extinguished for a while, he passed into the service of the new Cisalpine republic, and distinguished himself in various battles. In 1806, when Bonaparte called the Poles to arms, C., among others, obeyed, and fought gallantly at Eylau and Friedland. He was subsequently sent by the emperor into Spain, and in 1812 followed him to Russia, taking part in the bloody engagements at Smolensk and Moskwa. After the relics of the invading force had returned, C. left the imperial service, on account of receiving certain slights in the way of his professional advancement. After the taking of Paris by the allies in 1814, he led back to Poland the remains of the Polish troops who had fought under Bonaparte, and was well received by the Emperor Alexander, who made him a general of division. When the second insurrection of the Poles broke out in 1830, C., who foresaw the hopeless nature of the attempt, concealed himself; but the voice of the nation called him forth from his hiding-place, and on the 5th Dec., 1830, he was elected dictator. His moderate views, however, involved him in disputes with the extreme patriotic party, and on the 28d Jan., 1831, he resigned his office; but, to prove his sincerity, he entered the Polish army as a simple soldier, and took part in the murderous battles at Wavre and Grochow. After the suppression of the insurrection, C. went to Cracow, and withdrew altogether from public life. He died at Krzeschowitz, 30th Sept., 1854.

**CHLORAL**,  $\text{C}_2\text{H}_3\text{OCl}$ , an oily, colorless liquid, with a penetrating and peculiar odor prepared from anhydrous alcohol by the action of dry chlorine gas. Liebig discovered it in 1831, and Liebreich, in 1839, was the first to use the C. hydrate as an anæsthetic and hypnotic. It is closely allied to aldehyde, and dissolves phosphorus, sulphur, bromine, and iodine. It is composed of carbon, hydrogen, oxygen, and chlorine, formula  $\text{C}_2\text{H}_3\text{OCl}$ . Combined with water, it forms chloral hydrate, a transparent crystalline substance, having the appearance of alum, sometimes administered to induce sleep. Its effect is attributed to chloroform produced in the system from the chloral by the alkaline reaction of the blood. As a rule 20 grains cause in a healthy adult a light and refreshing sleep, after about half or three quarters of an hour, without headache or other bad results. Repeated use blunts the good effect, and causes serious nervous demoralization; overdoses have caused death. Chloral hydrate has special value where the use of opium is inadmissible; also in delirium tremens, mania, rheumatism, gastralgia, and as antagonistic to tetanus and the effects of strychnia. Yet it is seductive and dangerous.

**CHLORALAMID**, a preparation of chloral discovered by Prof. J. Von Mering, a German chemist, in 1889. It is prepared in the form of colorless non-caustic crystals, is soluble in from nine to fourteen parts of cold, or less of warm water, in one part of absolute, and one and a half parts of ninety-six per cent. alcohol. To understand its time of action, it is well to remember that it requires five hours to dissolve twenty grains in two ounces of water, and only fifteen minutes when the medium is one drachm of rectified spirit. No precipitation occurs on adding the alcoholic solution to water. It is essentially a hypnotic, and in hysteria, melancholia, insomnia, and hypochondriasis it is found to be particularly serviceable. It has also been administered with success in cases of painful menstruation. The dose is from 15 to 30 grains, with an average dose of 20 grains. The advantage in using chloralamid is that the influence of the drug will be sufficient to produce refreshing sleep for a period ranging from four to six or more hours, and that it does not show any special tendency to impair digestion. It is best administered in the form of a solution in a little whiskey, wine, or brandy, to which may be added a small amount of syrup. See HYPNOTICS.

**CHLORASTROLITE** (Geological). This delicate green-hued mineral is radiate or stellate in structure and takes a high polish. It is an impure variety of prehnite, very compact, forming nodules in the amygdaloid of Isle Royale, Lake Superior.



**CHLORIC ACID**,  $\text{HClO}_3$ , is the most important of the oxygen acids of chlorine, and is generally met with in combination with potash, as the white crystalline salt, chlorate of potash,  $\text{KClO}_3$ . This salt is mainly interesting from the readiness with which it parts with its oxygen to combustibles, as when thrown on red-hot charcoal, when it causes violent deflagration. The salt is employed in the fabrication of certain kinds of lucifer-matches, which give a slight explosion when struck. If a crystal of chlorate of potash be placed on a piece of paper saturated with turpentine, and a drop or two of oil of vitriol added, it causes the inflaming of the turpentine with explosive rapidity. The chlorate of potash is also used in medicine, with the view of imparting oxygen to the blood; its use, however, is attended with danger.

**CHLORIC ETHER**, a name formerly given to a compound of chlorine and olefant gas, also called chloride of ethylene, or *Dutch liquid*. Now applied to a mixture containing one part of chloroform and eight or nine parts of strong alcohol. Dr. John C. Warren's "chloric ether," used by him as an anæsthetic, contained one part of chloroform and two of alcohol. C. E. is used as a means of administering chloroform internally; it is a mild anodyne, useful to allay restlessness and spasmodic disturbances, as of the air-passages.

**CHLORIMETRY**, or **CHLOROMETRY**, is the process of estimating the proportion of available chlorine in bleaching powder (q. v.), which may vary from 20 to 86 per cent. The process depends upon the great power with which chlorine, in the act of being liberated from its compounds, causes the oxidation of many substances. The salt generally used is pure crystallized sulphate of iron, which, in its ordinary state, gives a deep blue color, with a drop of ferridcyanide of potassium, but ceases to do so when it has been fully oxidized, or converted from a proto-salt into a per-salt, through the influence of chlorine. It being known that 78.4 grains or parts of sulphate of iron are oxidized by 10 grains or parts of chlorine, the mode of procedure in C. is as follows: 78.4 grains of fine crystals of the sulphate of iron are dissolved in water slightly acidulated with hydrochloric acid in a white porcelain basin. A given quantity of the bleaching powder—say 50 grains—is dissolved in a little tepid water, and introduced into a tall measure-glass called a chlorimeter or burette, similar to an alkalimeter, which is divided into 100 parts, and water added till the solution rises to the top mark. After subsidence of the insoluble matter, the clear solution is very gradually poured into the solution of sulphate of iron in the basin, the whole being kept constantly stirred, and every now and again a drop of the iron solution is taken out and placed on a new drop of ferridcyanide of potassium placed on a white plate; and whenever the iron solution ceases to produce a deep blue, and only forms a light greenish-yellow tint, it is known that the iron has been fully oxidized by the chlorine. Suppose that at this stage the burette has been emptied to the 55th division; as we know that the liquid poured out must have contained 10 grains of chlorine, we can calculate the chlorine contained in the whole; for

$$55 : 10 :: 100 : 18.18.$$

Thus 50 grains of the powder contain 18.18 grains of chlorine, or 86.86 per cent. Protochloride of manganese, subchloride of mercury (calomel), or a solution of indigo of known strength, may be employed instead of the sulphate of iron; but the latter is preferable, and is generally employed by chemists and manufacturers.

**CHLORINE** (Gr. *chlōros*, pale green) is a non-metallic element discovered by Scheele in 1774, and named by him *dephlogisticated marine air*. Afterwards, in 1810, Davy proved it to be an elementary body, and gave it the name which it now bears. In nature it is always found in a state of combination. United with sodium, Na, it occurs very largely as the chloride of sodium,  $\text{NaCl}$ —common salt—in the ocean; in large beds, as rock-salt; in all natural waters, including even rain-water; in clays, soils, limestone; in volcanic incrustations; and in the vegetable and animal kingdoms. The preparation of gaseous C. by its liberation, directly or indirectly, from common salt, has been fully described under **BLEACHING POWDER**, which is the form in which C. is prepared and employed commercially. For experimental purposes, the gas may be received in jars filled with water at the pneumatic trough, when the C. rises into the jar, and displaces the water. When thus obtained, it is a yellowish-green gas with a peculiar and suffocating odor, is not combustible, and a very feeble supporter of ordinary combustion. A lighted candle placed in it burns with a very smoky flame, owing to the hydrogen of the oil alone burning, and the carbon being liberated. Several of the metals, such as antimony, copper, and arsenic in a fine state of division, or in the condition of thin leaves, at once become red hot, and burn when introduced into the gas. A piece of thin paper soaked in turpentine likewise bursts into flame. C. has the symbol Cl, and the atomic weight or equivalent of 35.5. It is a very heavy gas, nearly  $2\frac{1}{2}$  times heavier than air, its specific gravity being 2.470 (air=1000); it is soluble in cold water to the extent of two volumes of C. in one of water, and yields a solution resembling the gas in color, odor, and other properties. The principal properties of C. are those of a bleacher of cotton and linen (see **BLEACHING**), and a most powerful disinfectant (q. v.). The gas can be condensed by pressure and cold into a transparent dark greenish-yellow limpid liquid, with a specific gravity of 1380 ( $\text{H}_2\text{O}$ =1000), which also

possesses bleaching properties, and a most powerful odor. On the animal system C. acts, in very minute quantity, by producing a sensation of warmth in the respiratory passages, and increasing the expectoration; in large quantity, by causing spasm of the glottis, violent cough, and a feeling of suffocation. The workmen in chemical manufactories, who get accustomed to the C. in small quantity, are generally stout—at least, lay on fat—but complain of acidity in the stomach, which they correct by taking chalk, and also suffer from the corrosion of their teeth, which are eaten away to stumps. The antidotes to the evil effects of the introduction of C. into the lungs are the inhalation of the vapor of water, alcohol, ether, or chloroform; but the two latter should never be resorted to except under medical supervision.

C. unites with the metals and many other substances to form an extensive class of salts known as *chlorides*.

**CHLORITE** (Gr. *chlōros*, green), an abundant mineral, consisting of silica, alumina, magnesia, and protoxide of iron, in somewhat variable proportions. It is of a green color, rarely occurs crystallized in hexagonal crystals, sometimes foliated like talc. It is rather soft, and is easily broken or scratched with a knife. Before the blow-pipe, it is with difficulty fused on thin edges. It is readily distinguished from talc by yielding water in a closed tube.

**CHLORITE-SCHIST**, or **CHLORITE-SLATE**, a green slaty rock, in which chlorite is abundant in foliated plates, usually blended with minute grains of quartz, and sometimes with feldspar or mica.

**CHLORODYNE** is a patent or quack medicine of considerable popularity, invented by a Dr. Collis Browne, but largely imitated by various chemists. It contains opium, chloroform, prussic acid, and probably Indian hemp, and is flavored with sugar and peppermint. As it is apt to separate into two liquids on standing, it should never be taken unless it has previously been well shaken; and as, in taking a dose of chlorodyne, the patient swallows an unknown quantity of three or four of the deadliest poisons with which we are acquainted, it is always advisable to begin with small doses. It is unquestionably a compound which sometimes succeeds in allaying pain and inducing sleep, when opiates have failed; but whether a physician is justified in recommending a remedy with the composition of which he is unacquainted, is a doubtful question. Ten or fifteen drops is the average dose.

**CHLOROFORM**, or **TRICHLORMETHANE**,  $\text{CHCl}_3$ , was originally discovered by Liebig in 1831, and experimented upon by Dumas, and was long known only to scientific chemists as a rare organic body, possessing interest from being one of a series of organic substances, but not known to possess any properties likely to call it into use, or even likely to let it be known by name to the general public. The remarkable power, however, which it possesses of producing anæsthesia, has led to the preparation of C. on a very extensive scale. The materials employed are alcohol, water, and bleaching powder, and the proportions are four parts of bleaching powder, to which sufficient water is added to make a thin paste, and thereafter one part of spirits of wine; the whole is introduced into a capacious retort, which must not be more than half filled, and heat being applied, the C., accompanied by water and a little alcohol, distills over. As the C. is heavier than water, and is not readily miscible therewith, two layers of liquid are obtained in the receiver—the upper being water and alcohol, and the lower being chloroform. The upper liquid being cautiously poured off, the C. is agitated with fused carbonate of potash, which abstracts the remaining traces of water, and on subsequent redistillation the C. is obtained pure and ready for use.

C. is a highly limpid, mobile, colorless liquid, which is very volatile, has a characteristic and pleasant odor, and an agreeable sweetish taste. It has a specific gravity of nearly 1500 (water=1000), being half as heavy again as water, and boils at  $142^\circ \text{F.}$  ( $61^\circ \text{C.}$ ). It is not inflammable in the ordinary sense of the term, as it will not take fire when a light is brought down upon it; but when thrown on red-hot coals, it burns with a green flame, evolving much smoke. It is slightly soluble in water, but more readily mixes with alcohol and ether. It dissolves camphor, amber, copal, and other resins, wax, caoutchouc, black and red sealing wax, iodine and bromine, as well as strychnine and other alkaloids. Its purity may be determined by placing some on the palm of the hand, and allowing it to evaporate, when no alcoholic or other odorous substance should be even momentarily recognized; and by agitation with oil of vitriol, when, on settling, the C. should readily swim on the surface of the vitriol, and the two layers of liquid remain colorless. The employment of C. as an anæsthetic has already been considered under **ANÆSTHESIA**; but it may be here repeated that C. is a substance that cannot be too cautiously dealt with, and that it should never be administered except in the presence and by the sanction of a medical practitioner. When skillfully given, it is among the safest of all anæsthetics, and the greatest boon that chemistry has bestowed on suffering humanity.

**CHLORO METHYL**, or **METHYLENE BICHLORIDE**,  $\text{CH}_2\text{Cl}_2$ ; a liquid—clear, volatile, of pleasant odor; when inhaled, producing anæsthesia more quickly than chloroform, and usually free from disagreeable consequences. Like chloroform, not absolutely safe.

**CHLOROPHYLL** (Gr. *chlōros*, green, and *phyllon*, a leaf), the substance to which the leaves and other parts of plants owe their green color. It is somewhat analogous to wax, is soluble in alcohol and ether, but insoluble in water, and floats in the fluid of the cells, in the form of minute granules. Light is indispensable to its formation, and hence arises the familiar phenomenon of blanching (q.v.), either from accidental causes, or by the art of the gardener. Young leaves do not exhibit so deep a green as those which have been longer exposed to the light; and the green of a leaf generally deepens till it begins to change into the tints of autumn. *Hydra viridis*, and other minute animals, appear to owe their green color to a substance analogous to chlorophyll.

**CHLOROPS.** See CORN-FLY and WHEAT-FLY.

**CHLOROSIS** (Gr. *chlōros*, pale green), a peculiar form of anæmia or bloodlessness, common in young women, and connected with the disorders incident to the critical period of life. It has been called the *green sickness*, from the peculiar dingy greenish-yellow hue of the complexion; the green color, however, is not always characteristic. The disease is attended with very great debility, and often with breathlessness, palpitation, and other distressing or even alarming symptoms. When there is no organic disease present, however, C. may be pronounced curable in a large proportion of cases. The principal means to be employed are air, exercise, often salt-water baths, the use of iron, with a nutritious and rather stimulating diet, and purgatives if required; together with such special remedies as are adapted for restoring deficient secretions, and bringing the entire female system of organs into a natural condition.

**CHLOROSIS**, a diseased state of plants, in which a sickly green or greenish-yellow color takes the place of the natural lively hue. Sometimes only a particular shoot is affected by it, but very generally the whole plant; and it seems to depend upon causes which render the plant altogether unhealthy, the pallid appearance being merely symptomatic, and not only the formation of chlorophyll, but all the functions of vegetable life being languidly and imperfectly carried on. Bad seed, damp soil, and cold wet weather, appear to be the most common causes of chlorosis. Plants affected by this disease are often to be seen among crops generally healthy; but whole crops of grain, potatoes, etc., sometimes perish from it, or are much diminished in value. Fruit-trees also suffer from it.

**CHLOROXYLON**, plants of the order cedrelaceæ, the fruit having only three cells and splitting into three parts. The satin-wood of India is a specimen.

**CHOATE, JOSEPH HODGES**, lawyer, b. Salem, Mass., Jan. 24, 1832; graduated at Harvard, 1852, and at the Dane law school, 1854; admitted to the bar, 1855; and afterwards practiced in New York. He was counsel for Gen. Fitz John Porter; a member of the Committee of Seventy; president of the New York state constitutional convention of 1894; and unsuccessful candidate for U. S. senator in 1897.

**CHOATE, RUFUS, LL.D.**, 1799-1859; a native of Massachusetts. In 1824 he commenced the practice of law in Danvers, soon removed to Salem, and in 1825 and 1827 was a representative and a senator in the state legislature. In 1832 he was elected to congress, and on the expiration of his term, removed to Boston. In 1841 he was chosen U. S. senator to fill Daniel Webster's unexpired term, the latter having been appointed secretary of state. In 1846 he resumed law practice in Boston, and in 1853 was chosen attorney-general of the state. His mind was acute, his scholarship broad and fine, his rhetoric magnificent. For many years he was recognized as the foremost lawyer of New England, and was especially renowned for eloquence in pleading. His more famous efforts were a eulogy on President Harrison, an address on the landing of the Pilgrims, and a eulogy on Daniel Webster. His works and correspondence have been published.

**CHOCARD**, or CHOQUARD, *Pyrrhocorax*, a genus of birds of the crow family (*corvidæ*), differing from the choughs in having a shorter bill, which, however, is arched like theirs, but resembling them in their habits. The only European species is the Alpine C., also called Alpine chough, and Alpine crow (*P. pyrrhocorax*). It is about the size of a jack-daw, of a brilliant black, with yellowish bill and red feet.

**CHOCO**, a bay and province of New Granada, in South America.—1. The bay, forming part of the gulf of Darien, receives the Atrato (q.v.), a stream of note in connection with interoceanic communication. Its lat. and long. are about 8° 30' n., and 77° 30' west.—2. The province forms the w. portion of the department of Cauca (q.v.).

**CHOCOLATE** is made from the seeds of *theobroma cacao* (see COCOA), reduced to a fine paste in a heated iron mortar, or by a machine, and mixed with pounded sugar and spices, as cinnamon, cloves, cardamom, vanilla, etc. The paste is then poured into molds of white iron, in which it is allowed to cool and harden. C. is sometimes made without spices, but is then more generally called cocoa. The paste is sometimes mixed with flour, and with Carrageen or with Iceland moss; and for medicinal purposes with cinchona, etc. C. is used as a beverage, and for this purpose is dissolved in hot water or milk. Sometimes the yolk of an egg is added, and sometimes it is dissolved in soup or wine. It is also employed in making certain liqueurs. In a pure state, it soon satisfies the appetite, and is very nourishing; when it contains spices, it is also stimulating. Good C. is externally smooth, firm, and shining—not gritty in the fracture—easily soluble, aromatic; not viscid after having been liquefied and cooled, but oily

on the surface, and leaves no sediment of foreign substances. C. is adulterated in many ways, by mixing it with rice-meal, oat-meal, flour, potato-starch, roasted hazelnuts or almonds, and with benzoin, storax, etc., in place of vanilla. The Mexicans, from time immemorial, were accustomed to prepare a beverage from roasted and pounded cocoa, dissolved in water, and mixed with maize-meal and spices. This they called *chocolatl* (*choco*, cocoa, and *latl*, water). From the Americans, the Spaniards derived an acquaintance with C., and by them it was introduced into Europe in 1520. C. is used in South America, Spain, and Italy, more than in other parts of the world, although it is used to a considerable extent in Germany. Its use in Britain has given place in a great measure to that of the simpler cocoa.

**CHOCOLATE ROOT.** See **GEUM**.

**CHOCTAW**, a co. in s.w. Alabama, on the Mississippi border; 916 sq.m.; pop. '90, 17,526, includes colored. It is watered by tributaries of the Tombigbee. Production chiefly agricultural. Co. seat, Butler.

**CHOCTAW**, a co. in central Mississippi, on Big Black river; 404 sq.m.; pop. '90, 10,847, includ. colored. Agriculture is the chief business. Co. seat, Chester.

**CHOCTAWS**, or **CHACTAS**, a tribe of American Indians now occupying a portion of the Indian territory on Red river, numbering about 16,000, and possessing 10,450 sq.m. of land. When first known to Europeans they occupied the country now forming the w. part of Alabama and s. part of Mississippi. When Louisiana was settled they formed an alliance with the French against the Chickasaws and the Natchez. By degrees they became friendly to the English, and in 1786 they recognized the supremacy of the federal government. About 1800, they began to emigrate beyond the Mississippi. In the war with England and the Creek war they did great service to the union. Georgia gave them special privileges, even making them citizens, but they preferred to emigrate, and were all gone soon after 1830. In 1818, missions were established among them. In the civil war, they went with the confederates, but after it was over new treaties were made by the United States, slavery was abolished, and other necessary changes made. They have a regular constitution, prefaced by a bill of rights. Free males 21 years old and six months citizens of the nation are voters. There is a house of representatives of 17 to 35 members chosen for two years. The governor is elected for two years by the people, and is eligible for four years only out of any term of six. There are courts, supreme, civil, and probate; and justices of the peace. Books are printed in their language, and a newspaper is regularly issued every week at their chief town.

**CHODOWIEŹKI**, **DANIEL NICOLAS**, 1726-1801; a Polish painter and engraver who designed and engraved subjects from the seven years' war, and subsequently the "History of the Life of Jesus Christ," a series of miniature paintings that made him at once famous. Thereafter he was represented by his work in almost every book of importance published in Prussia in which engravings could be used. Still, the picture of "Calas and his family" is the only one of C.'s that has wide reputation.

**CHENIX**, a Grecian measure of capacity variously represented as equal to 0.186, 0.248, and 0.495 of an English gallon. It is supposed to have been used chiefly for measuring grain.

**CHERILUS**, a Greek tragic writer of the time of Thespis and Æschylus. He was a competitor for the tragic prize in 529 B.C. It is said that he took 13 prizes, and was the author of 150 tragedies, besides other works that have been lost.

**CHERILUS OF SAMOS**, a Greek writer, b. about 470 B.C.; author of a poem treating of the wars of Greece with Darius and Xerxes. Fragments of his writings have been preserved in the works of Aristotle, Josephus, and Ephorus.

**CHOIR** (Lat. *chorus*). In its literal sense, the C. is the portion of the church devoted to the singers; and in all descriptions which concern the ritual it is so limited, including only the space from the western door or screen to the end of the stalls, whilst the part from the stalls eastward to the high altar is called the presbytery. But in ordinary language, and even as used by architects, it denotes the entire space which is inclosed for the performance of the principal part of the service. In this sense, it includes the C. proper and the presbytery, and corresponds to the chancel in parish churches. Where the church is cruciform, and the term is confined to the eastern limb, it comes to be entirely different from the C. in the ritual sense, or the stall-place, which in such a building is commonly situated either under the tower or in the nave. In large churches, the aisle generally runs along each side of the C., and frequently passes across the e. end of it; an arrangement which is very common in the larger churches of the continent which have polygonal or semicircular terminations.—C. is also the name given to the singers of the choral service.

**CHOIR-SCREEN**, or **CHOIR-WALL**, the screen or wall which divides the choir and presbytery from the side aisles. It is often very richly ornamented.

**CHOISEUL**, **CLAUDE ANTOINE GABRIEL**, Duc de, 1760-1838; a col. of dragoons during the French revolution, and a warm supporter of the royal cause. He made an attempt to rescue Louis XVI. from the revolutionists, but the royal party was recaptured, a price was set upon C.'s head, and he was compelled to fly. He raised a regiment of

hussars and joined the royalist army. He was finally taken prisoner and confined at Dunkirk. He escaped, and sailed for India, but was wrecked on the coast of France, captured, and condemned to death. Yet he escaped death, and at the restoration he was called to the house of peers by Louis XVIII. In the revolution of 1830, he was a prominent member of the provisional government, and afterwards received from Louis Philippe the post of aide-de-camp to the king and governor of the Louvre.

**CHOISEUL-AMBOISE**, ETIENNE FRANÇOIS, Duc de, minister of Louis XV., was b. June 18, 1719, educated by the Jesuits, and on the completion of his studies, entered the army. He fought bravely in the Austrian wars of succession; but only after he had attracted the fancy of the king's mistress, Madame Pompadour, did fortune also really favor him. Through the influence of Madame Pompadour, he was made lieut.-gen. in 1748, ambassador to the courts of Rome and Vienna in 1756, and duc de Choiseul in 1758. C. now became instrumental in bringing about a family league of the Bourbon monarchs in Europe; and in 1763, at the close of the war so disastrous to the French arms, he obtained, by his prudence and dexterity, milder terms for his nation than had been expected. This made him very popular, as did also his successful attempt to overthrow the Jesuits. In 1764, Madame Pompadour died, but the power of C. continued unabated. He conceived, and almost carried out, a plan for the formal emancipation of the Gallican church from papal influence, paid great attention to the improvement of the army and navy, developed the trade and industry both of the nation and of the colonies, and opened up anew an intercourse with India, whose native princes were assisted by French officers in their endeavors to expel the British from the peninsula. He had spies in every European court, and so ruled all diplomatic and political cabals, that the empress of Russia, who dreaded him, called him *Le Cocher de l'Europe* ("the driver of Europe"). But the rise of Madame Dubarry, who succeeded Madame Pompadour in the royal affections, gradually alienated Louis from his able minister, and in 1770 he retired to his magnificent estate of Chanteloup, where he lived in princely splendor. After the accession of Louis XVI., C. received permission to return to Paris. He was often consulted, but never recovered his official position. He died May 7, 1785.

**CHOISEUL-GOUFFIER**, MARIE GABRIEL FLORENT AUGUSTE, Comte de, 1752-1817; a French scholar who traveled in the east, and published in 1783 the first volume of his *Voyage Pittoresque en Grèce*. During the revolution he adhered to the royal cause, and afterwards went to Russia, where he was made director of the imperial libraries, and of the academy of fine arts. Another part of his work appeared in 1809, and the concluding portion in 1824, after his death.

**CHOKO-CHERRY**, a name given to certain nearly allied species of cherry (q.v.), of the bird-cherry section of the genus or sub-genus, natives of North America, having small fruit in racemes, and the fruit at first rather agreeable, but afterwards astringent in the mouth. Some confusion has long existed as to the different kinds, and their botanical names (*prunus* or *cerasus virginiana*, *serotina*, and *borealis*) are not more determinate than the popular ones. Perhaps they ought to be regarded as mere varieties rather than distinct species. They have a considerable resemblance to the Portugal laurel, although the leaves are deciduous. The bark is used as a febrifuge and tonic, under the name of *wild cherry bark*; and by distilling it with water, a volatile oil is obtained from it associated with hydrocyanic acid, called *oil of wild cherry*. This bark allays nervous irritation, and is particularly suitable as a first tonic in cases of recovery from fever or inflammation.

**CHOKO-DAMP**. See CARBONIC ACID.

**CHOKING**, the obstruction of the gullet, or of the passage leading to it, by morsels of food imperfectly chewed, or other substances accidentally swallowed. The consequences of C. in the human subject are serious, and will be best considered in connection with the parts concerned. See PHARYNX and ŒSOPHAGUS. What follows relates to the C. of cattle.

*Causes*.—These may be classified under two heads: 1. Those that depend on the material swallowed; and 2. Those that depend on the animal swallowing. Under the first head we find sharp-pointed objects which become fixed into or entangled in the membrane lining the throat and gullet; solid masses too large to pass on to the stomach; dry farinaceous materials which clog in the passage. The second class of causes consists in inflammation of the throat, or irritation of the organs of deglutition; constrictions of the passage, as in crib-biting horses; ulceration of the œsophagus, which is apt to run after C., and is the cause of a relapse; lastly, without any disease of the deglutating organs, an animal may be choked by eating too greedily, and imperfectly masticating or salivating its food.

*Symptoms*.—These vary according to the position of the obstruction. If high up in the pharynx, the animal cannot swallow, evinces great distress, and attempts to cough up the object. Saliva drivels from the mouth, the animal chews, and makes an occasional ineffectual effort to swallow. The breathing is very greatly disturbed. In some cases a large lump of food has become fixed in the larynx or upper part of the windpipe, and has suddenly suffocated the animal. When the obstruction is in the course of the gullet down the neck, the symptoms are very similar, though less urgent, and there is addition-

ally the local sign of swelling, with the peculiar hardness or softness of the substance indicating its nature. When an animal is choked by a substance lodging in the gullet within the chest, the symptoms are more mysterious, and likely to mislead. The animal swallows; a considerable quantity of liquid may enter the gullet, but it is suddenly regurgitated or thrown up, as in the act of vomiting. The distress is great; and in the course of three or four days, unless the animal is relieved, it dies of prostration. In the ox, sheep, and goat, the most alarming symptoms, in any case of C. arise from the paunch becoming distended by gas. This condition will be treated under the head **HOVEN**.

**Treatment.**—Remove the obstruction with the hand, when you can. Cause the animal to swallow the substance, if possible, by giving it water or oil. Carefully push the offending agent down by a probang, if it is possible to effect this, and if withdrawal by the mouth is impracticable. In some cases, the gullet has to be cut into by a qualified surgeon. After a case of C., keep the animal on soft food, and attend to its general health, in order to avoid a relapse, which is of frequent occurrence in cattle.

**CHOLAGOGUE** (Gk. *cholos*, bile; *agein*, to lead), a cathartic medicine which increases the flow of bile. Cholagogue acts either by promoting the secretion of bile, or by facilitating the flow of bile from the gall-bladder into the duodenum, or by hurrying the bile through the intestines before it or its contents can be absorbed.

**CHOLERA**, a Greek term used in the Hippocratic writings, but of indeterminate etymology, being derived perhaps from *cholē*, bile, or from *cholera*, a water-spout or gutter. It is now universally employed in medicine as indicating one of two or three forms of disease, characterized by vomiting and purging, followed by great prostration of strength, amounting in severe cases to fatal collapse. The variety called *cholera sicca* (dry C.) by ancient writers (in which collapse and death take place without discharges) is comparatively rarely observed. The milder forms of C. occur almost every summer and autumn, even in temperate latitudes, and are hence termed by some—in reference to this country, and by way of contrast—British or summer C.; while the more devastating and fatal forms of the disease are generally supposed to originate only in tropical countries—especially in India—and thence to be propagated epidemically over vast populations, and in a somewhat regular geographical course, reaching this country usually through Persia, the steppes of Tartary, Russia, and the Baltic, at the same time extending to Egypt, Turkey, and the south of Europe. These very fatal forms of the disease are commonly called Asiatic, Oriental, or epidemic C.; sometimes cholera morbus, or pestilential cholera. The milder forms are sometimes also called bilious C.; and the severer, spasmodic C., from the character of the symptoms in each. Some writers of great authority are inclined to consider the two forms as one disease, varying in individual cases and according to season. It is certain that it is not always possible to distinguish the one form from the other in particular instances; but the marked difference between the mortality of groups of cases of British C. on the one hand, and of Oriental or Asiatic C. on the other, renders it probable that there is something in the latter disease which amounts to a distinction in kind. Whether in the milder or severer form C. is usually ushered in by a period of premonitory symptoms, when the more distinctive characters of the disease are not established; the case resembling one of common diarrhea (q.v.) or looseness of the bowels. At this stage it is very apt to be neglected, and unfortunately, in the severer epidemic forms of the disease this is the only stage much under control. Whenever, therefore, there is a reasonable suspicion that epidemic C. is threatened, every person attacked with diarrhea should make a point of placing himself under medical advice, and, if possible, of escaping from any situation in which epidemic disease is known to be prevalent. He should also be particularly attentive to diet, and especially to the purity of the water he drinks, and to its absolute freedom from contamination by animal matters filtering through the soil, or thrown into water-courses by sewers, etc. If water absolutely cannot be had in a pure state, it should be boiled before being used for drink, or indeed for any domestic purpose. Many cases of C., and several local epidemics, have been traced in the most positive manner to organic impurities of the drinking-water; and no single cause of the disease has been established by so much evidence as this. Hence, in all probability, arises the well-known preference of C. for low situations, and particularly for the low-lying flats on the banks of rivers, especially where the inhabitants are supplied with water from places polluted by sewerage.

It is hardly within the scope of a work such as this to present a minute description of fully developed C. in its severer or Asiatic variety. It is truly an appalling pestilence too easily recognized by a few leading features. After some hours or days of simple relaxation of the bowels, vomiting commences, and occurs again and again, accompanied by frequent and extremely copious discharges downwards, at first of matters colored with bile as usual, but in the end of colorless and turbid fluid resembling water in which rice has been boiled. These discharges (often to the extent of gallons of liquid), succeeding each other with the most alarming rapidity, act as a drain upon the fluids of the body generally; and by the changes they effect upon the blood, contribute to bring about the state called *collapse*. In this condition, the patient lies motionless and apathetic, except when tormented by cramps, which are of frequent occurrence; the surface is cold; the finger ends, lips, and tip of the nose become livid; the eyes are deeply sunk in the sockets, and often bloodshot; the tongue is clammy; the breath without any sensible warmth when caught on the hand; the pulse is suppressed at the wrist,

the breathing extremely slow and feeble, the heart just audible through the stethoscope. Purging and vomiting have ceased; even the urinary secretion has dried at its source. In fact, all the vital processes are nearly brought to a stand, and unless reaction comes, a few minutes, or at most a few hours, suffice to bring life to a close. Reaction in the most favorable cases is gradual and without accident; it is not unfrequently, however, accompanied by fever, closely resembling typhus, and constituting, at least in the temperate zone, one of the chief dangers of the progress of cholera.

Medicine is almost powerless against C., except in the earliest stages, in which the treatment usually pursued in diarrhea (q.v.) has sometimes been found useful. Very remarkable temporary restorative effects have been found to follow the injection into the veins of dilute solutions of saline matter, resembling as nearly as possible the salts of the blood which are drained away in the discharges. In 1892, an American physician, Dr. Elmer Lee, introduced treatment by intestinal irrigation, which consists in washing out the lower bowel with soapsuds or some mild antiseptic by injection, the lower bowel being the seat of the cholera bacillus or *spirillum*. This treatment, tried by Dr. Lee in the Russian cholera hospitals, reduced the death rate from 50 per cent. to about 12 per cent. of all cases.

Several epidemics of cholera have occurred in the United States. In the spring of 1832, Irish emigrants brought it to Detroit by the way of Quebec. There, soldiers going to the Black Hawk war contracted it, and spread it through many of the Western forts. Finally, the epidemic reached New Orleans, where 6000 died out of a population of 55,000. It visited the country again in 1834, 1848, 1853, 1865, 1867, and 1873. The worst of these visitations were in 1848 and 1865. In 1892 a few sporadic cases occurred, owing to the immigration from Hamburg, which in that year suffered greatly from the cholera.

**CHOLERA INFANTUM.** A disease of infants characterized by intestinal disturbance more or less obstinate and dangerous. Opinion is unsettled in regard to the nature of the complaint, and it passes under different names in different countries. In this country, besides C. I. a common name for it is *summer complaint*, because it is essentially a disease of hot weather. Most British authorities describe it under the general head of diarrhea, others call it weaning brash, watery gripes, and choleric fever of children. In France it has various names, principally alluding to its location, as colenteritis, follicular enteritis, and gastro-intestinal catarrh, the latter name being also the one in most frequent use in Germany. But the disease as it is known in this country, and doubtless elsewhere, depends upon a variety of pathological conditions, which, however, may change from one to another during the progress of the case. The causes of the complaint are not completely settled, although all the authorities agree that hot and badly ventilated apartments and malaria generally are highly conducive to it. The older American physicians were, with Dr. Benjamin Rush, accustomed to call it infantile bilious remittent fever, and many of the cases which occur in those rural districts where remittent malarial influences prevail have much of the character of remittent fever, but in cities, particularly where the sewerage is bad, and the streets are suffered to be choked with decaying garbage, the diarrhea has more the character of that of typhoid fever, and many of the symptoms are of a general typhoid, that is, of a weak nervous character. Too high a heat maintained in the nursery, will, if continued, probably so alter the functions of secretion as to bring on the disease; especially if the diet is defective, as from poor milk, or the injudicious giving of solid articles of food. It sometimes comes on very suddenly, but is often insidious in its advances, deluding the mother and family with the idea that it is merely a temporary diarrhea that will soon pass away, or can easily be relieved. The attack, however, may commence with violent symptoms, and there will be much excitement of the circulation, with vomiting and purging. There is in all cases great weakness of the digestive and assimilative powers. Milk which has been given but a short time before is voided by the rectum in curds, mixed with greenish slime of various depths of color, and containing fibrinous shreds and gelatinous masses, indicating mucous inflammation, and having a peculiar and diagnostic odor. The evacuations are preceded by colic pains, often intense, the movement usually giving temporary relief. The abdomen may be quite full at first, but gradually, often rapidly, grows gaunt, with more or less rapid emaciation of the whole body. The child becomes peculiarly fretful and impatient, the expression of its features and its general appearance being highly diagnostic to the experienced observer. In advanced stages there is a withered, clammy appearance of the hands, arms and legs, peculiar to the disease. Without change of air or diet, or under bad treatment, the disease usually runs a rapid and fatal course, but sometimes, under fair but not decided treatment, the sufferer lies for several weeks, when, according to statistics, death is more likely than recovery. There is a considerable difference, according to the testimony of practitioners, in the mortality which occurs in the practice of different individuals. In some charitable institutions the deaths of cases of C. I. run as high as 70 per cent, even under as good hygienic regulations as may be had in a city, and many private physicians, from the result of their practice, place the percentage of deaths above 50 per cent. There are others, and they form a large portion of the profession, who maintain that under their method of treatment the

mortality is much less, ranging on an average from 10 to 25 *per cent.*, and even below this. All concur as to the importance of pure air and proper diet. Often the simple removal to a mountainous district will, alone, result in recovery; or even a change from hot to cold weather, without removal, will often produce decided relief. As the digestive functions are very much weakened, the food should be the most digestible which can be obtained, also nutritious. If the case be one in which the child is suckled by the mother, but there is reason to suppose that her milk disagrees with it, weaning may be advisable; but, as a rule, the mother's milk is the best food for a child under 14 months of age. When a child is fed from a bottle, beef tea, made either from fresh beef, or from beef extract, may be given with advantage. Farinaceous articles, such as farina, tapioca, corn-starch, and arrowroot, are, contrary to the ill-advised conclusions of many, not proper food for infants. The only article of the kind that ever ought to be given in a case of cholera infantum, is rice water, which, from its slight astringent properties, may sometimes be given in moderate quantities together with good milk and beef tea. The radical difference between physicians, in the medical treatment aside from hygienic measures, and aside from any reference to the different "schools" of medicine, consists in the degree of reliance to be placed upon opiates and astringents, or, in other words, upon palliative treatment, as distinguished from that which seeks to produce a decided change in the functions of the various secreting organs, a great majority of which are manifestly much deranged in the disease under notice. The bile is scanty and not of normal character, and the inflamed and highly irritated mucous membrane of many parts of the intestinal tract interferes greatly with the functions of the mucous glands of these parts. There has long been a discussion among physicians as to the therapeutical value of mercurial preparations, particularly as to calomel, and its power of influencing the secretion of the liver, and diminishing inflammation. It seems proper therefore to say that in the experience of the most successful physicians it is found that the administration of small and oft repeated doses of calomel in cases of C. I. is attended, as a rule, with decidedly beneficial results; so that in the course of two or three days, frequently in a few hours, a change takes place for the better in the character of the fecal evacuations and in the appearance of the patient. The administration of the calomel alone, given in a little pulverized sugar, slightly moistened and placed on the child's tongue, in quantities from one-twelfth to one-quarter of a grain, and repeated every two, three, or four hours, will often produce decided relief; but it is generally advisable, or necessary, also to give a slight opiate, such as paregoric elixir, and perhaps a few drops of the tincture or aromatic syrup of rhubarb. The calomel must be persisted in for several days after the evacuations have become natural, although not given so often. It is a rule, with but few exceptions, among physicians of experience, that an infant cannot be salivated. On the contrary, the child grows strong and hearty under the use of calomel in those cases when the secretions are much deranged and the system reduced. In doses sufficiently small it undoubtedly possesses the power of improving assimilation. Warm baths, or rather warm sponging, and general attention to cleanliness, and the preservation of an equable temperature, should not be neglected.

**CHOLESTERINE** is one of those bodies which are termed by chemists lipoids, or non-saponifiable fats. It was originally discovered in gall stones, but is now recognized as an ordinary constituent (although occurring in very minute quantity) of bile, blood, and the tissue of the brain. It likewise occurs in pus, the contents of cysts, and other morbid fluid products.

It separates from its solutions in glistening nacreous scales, which, when examined under the microscope, appear as very thin rhombic tablets, whose obtuse angles are  $100^{\circ} 30'$ , and whose acute angles are  $79^{\circ} 30'$ . Different formulæ have been assigned for its composition, the one generally accepted being  $C_{26}H_{44}O \cdot H_2O$ . It is not always very easy of detection in animal fluids, but if, by its insolubility in water, acids, and alkalies, and its solubility in hot alcohol and ether, it has been recognized as a fatty substance, it may be readily distinguished from all similar substances by the measurement of the angles of its rhombic tablets. The best method of preparing C. is by boiling gall-stones containing it in alcohol, and filtering the solution while hot. From this hot filtered solution it crystallizes as the fluid cools.

Chemists have obtained substances known as *cholesterilins* and *cholesterones* from the decomposition of cholesterine.

**CHOLET**, a t. of France, in the department of Maine-et-Loire, on the right bank of the Maine, 32 m. s.w. of Angers. Here, during the Vendean war, two actions were fought in 1793, in both of which the royalists were defeated. In the first, they lost their brave Gen. Bonchamps; and the second drove them across the Loire, thus virtually deciding the war against them. It has manufactures of fine woollen and mixed fabrics, and leather, and a trade in cattle. Pop. of commune, '91, 16,891.

**CHOLIAMBIC**. See METRICAL FEET.

**CHOLULA**, a once flourishing, but now decayed, t. of Mexico, 60 m. to the e.s.e. of the capital, and 15 to the w.n.w. of La Puebla. Cortes found in it 20,000 houses, and as many more in the suburbs, and also 400 temples. Now the place contains only about 6,000 inhabitants. Its most remarkable memorial of aboriginal times is a pyramid of



clay and brick, surmounted on the top by a chapel of Spanish origin. Its height is 177 ft., while the side of its base measures 480 yards. C. stands on the table-land of Anahuac, at an elevation of 6,912 ft. above the level of the sea.

**CHON'DRINE.** See GELATINE.

**CHONDROPTERYGII.** See CARTILAGINOUS FISHES.

**CHO'NETES**, a genus of fossil brachiopodous mollusca, nearly allied to the well-known genus *productus*. It is characterized by its transversely-oblong shell, and by having the long margin of the ventral valve armed with a series of tubular spines. Twenty-nine species have been described from the paleozoic formations. See *illus.*, SILURIAN AND DEVONIAN FOSSILS, vol. XIV.

**CHO'NOS ARCHIPELAGO**, a group of islands off the west coast of Chile, lat 44° to 46° s., long. 74° to 75° west. With the exception of a few of the most westerly, all are bare and scantily peopled, though several are of considerable extent.

**CHONS**, or KHONSOU, an Egyptian deity worshiped at Thebes as the great eldest son of Amen-Ra and Mut, and identified with the moon. The Greeks thought him to be a form of Hercules. Like Horus, he is represented as a youthful god, his form mummied, wearing the lock of hair at the right side of his head, and a skull-cap surmounted by the full and dichotomized lunar disk; or hawk-headed, wearing the same. He holds a crook and whip. He was a celestial deity, and at a later time connected with Thoth, and was said to have proceeded from Nu or Han, the celestial waters. A tablet found in a temple at Karnak which was dedicated to this god, records the departure of C. in his ark in the 16th year of the reign of Rameses XII. to the land of Baktan to expel a demon which had possessed the daughter of a king of that country and sister of the queen of Egypt. He succeeded, and returned in his ark 17 years later. The worship of C. appears to have been common in the Ptolemaic period, and figures of the god in porcelain and bronze are not uncommon. He represents the youngest, as Ammon did the oldest, of the divine circle.

**CHONTALES**, a district of Nicaragua, n.e. of lakes Nicaragua and Managua, traversed by the Cordilleras, along the slopes of which are valuable mines. There are a number of small towns peopled chiefly by native Indians. Some of the gold mines now worked by them were worked by the early Spanish adventurers. There is a bed of coal near lake Nicaragua. The grassy plains among the mountains support large herds of horses and cattle. Tropical fruits grow abundantly.

**CHOPIN** (FRANÇOIS), FRÉDÉRIC, composer, was born in Zela Zowa Wola, near Warsaw, Poland, March 1, 1809; and died in Paris, Oct. 17, 1849. His father, Nicholas, a Frenchman, settled in Warsaw, where he taught at the Lycée, and afterwards conducted a private school; and his mother, Justine Kryzanowska, was a Pole. Chopin was educated by his father, and studied music under Zywny and Joseph Eitner. At the age of nineteen he was a virtuoso on the pianoforte, and had composed many dances. In 1828 he gave concerts in Vienna and Munich on his way to Paris, where he became a favorite in artistic circles, numbering among his followers the young Liszt. Chopin gave his life to teaching and composing, and played but little in concerts. As a pianist he was noted for his brilliancy, grace, and depth of sentiment, and capriciousness in time and rhythm. With the exception of a winter in Majorca with George Sand, in 1838, and visits to England and Scotland, in 1848-49, Chopin passed his time after 1830 in Paris, and is buried at Pere la Chaise, between the graves of Bellini and Cherubini. In 1836 Liszt introduced him to George Sand, with whom he made a liaison that lasted until about 1846, when, after distorting his character in her novel, *Lucrezia Floriani*, as Prince Karol, she grew tired of him. Schumann's opinion of Chopin in music was that of "the boldest and proudest spirit of the times." He wrote almost entirely for the pianoforte, and his compositions have never been excelled. They stand alone, and are adapted to the nature of the instrument, strong and exquisite in sentiment, delicate and poetic in fancy, original in rhythm, and rich in tone-color. The polonaises, mazurkas, and valsees contain many effects of Polish national music blended with French culture and taste. Chopin's works include 2 Concertos in E minor, op. 11, and F minor, op. 21; Allegro de concert, op. 46; 4 Ballades, Barcarolle, Berceuse, Bolero; 3 Ecosaisées, 12 Grandes Etudes, 15 Études, 4 Fantasies, 8 Impromptus, Marche funèbre, 52 Mazurkas, 19 Nocturnes, 12 Polonaises, 24 Préludes, 5 Rondos, 4 Scherzos, 4 Sonatas, 18 Valsees; Tarentelle; Trio for pianoforte, violin, and violoncello; Variations; and 16 Polish songs for one voice with pianoforte. See Liszt, *Chopin* (Paris, 1852); Barbedette, *do.* (Paris, 1869); and Karasowski, *Friedrich Chopin, sein Leben* (Dresden, 1877).

**CHOPINE** (Spanish, *chopin*), a high clog, or slipper, deriving its name, as is supposed, from the sound *chop*, *chop*, made by the wearers in walking. Chopines were of eastern origin, but were introduced into England from Venice during the reign of Elizabeth. They were worn by ladies under the shoes, and were usually made of wood covered with leather, often of various colors, and frequently painted and gilded. Some of them were as much as half a yard high; and in Venice, where they were usually worn, their height distinguished the quality of the lady. The C. is mentioned by Shakespeare in *Hamlet*.

**CHOCTANK RIVER** rises in Delaware, and flows s.w. through that state and Maryland, forming a wide estuary as it nears Chesapeake bay, into which it empties. It is navigable for small vessels for about 50 miles.

**CHORAGIC MONUMENTS.** The choragus, or person at Athens who, on behalf of his tribe, had supported the chorus (q.v.), and who, in competition with the other tribes, had exhibited the best musical or theatrical performance, received a tripod for a prize; but he had the expense of consecrating it, and of building the monument on which it was placed. There was at Athens a whole street formed by these monuments, called the "street of the tripods." A fine specimen still remaining is called "the choragic monument of Lysicrates."

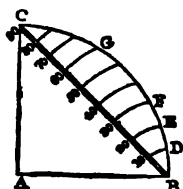
**CHORAGUS.** See CHORUS.

**CHORALE**, a musical term adopted from the German, means a melody to which sacred hymns or psalms are sung in public worship by the whole congregation in unison. The melody of the C. moves in notes of a slow and strictly measured progression, and of a solemn and dignified character that disposes the mind to devotion. Although the term C. is now always applied to the music of the Protestant church, it belonged to the Christian church at all times, as melodies still in use can be traced with certainty to have been sung by the congregations in the first centuries of Christianity. Among these is the song of praise by St. Ambrose, still retained in the Lutheran church, to the words "Herr, Gott, dich loben wir." The C. is intimately connected with the history of music, as vocal music was the only kind used in worship until far on in the middle ages. The C. is precisely what our psalm-tune is, or rather what it formerly was, and ought again to become. The pure, simple C. has, in a great degree, been cast aside in modern times, and its place occupied by tunes of a comparatively puerile style, which are frequently only adaptations of operatic songs and other profane pieces.

**CHORAL MUSIC**, the ancient music of the church. Music in parts for different voices. See SACRED MUSIC.

**CHORAL SERVICE**, the musical service of the Catholic church, celebrated by a full complement of clergymen and choristers in a cathedral church, and when all those parts of the service are sung as ordered in the rubrics.

**CHORD.** The C. of an arc of a curve is a straight line joining its two extremities. A SCALE OF CHORDS is used in laying off angles. It is thus constructed: Let AB be



the radius of the circle to which the scale is to be adapted. With center A and radius AB describe a quadrant BEC. Divide the quadrantal arc BEC into nine equal parts BD, DE, etc. This may be done by taking a radius equal to AB, and from the centers B and C cutting the arc in G and F. As the radius is always equal to the chord of 60° or  $\frac{1}{2}$  of a quadrant, the arc CB is thus divided into three equal parts, BF, FG, GC, and each of these parts may then be trisected by trial, as no direct method is known. Draw the chord of the quadrant BC; from B as a center, and the chord of BD as a radius, describe an arc cutting BC at 10; with the chord of BE as a radius, describe an arc cutting BC in 20; with the chord of BF, describe an arc cutting BC in 30; and in a similar manner, find the divisions 40, 50, 60, 70, 80. Then the arcs BD, BE, BF, being arcs of 10°, 20°, 30°, etc., respectively, the distances from B to 10, 20, 30, etc., are the chords of arcs of 10°, 20°, 30°, etc.; so that BC is a scale of chords for every 10°, from 0° to 90°. To lay down or measure angles with such a scale, the arc of measurement must be described with the chord of 60°.

**CHORD**, in music, is the simultaneous union of different sounds, at first intuitively recognized by the ear, and afterwards reduced to a science by the invention of the laws or rules of harmony. See HARMONY. Chords may consist of from two to five parts. Absolute chords of two parts are produced only by thirds or sevenths. Chords of more than two parts are either fundamental chords or inversions of them, and are divided into concords and discords. The union of sounds in all chords will be found, on analyzing their component parts, to be an admixture of major and minor thirds. The common chord, or triad, is the basis of all harmony, and con-

sists of a bass note, or prime, with its third and fifth above, thus: These

three sounds are at the distance of a third from each other. When the lowest third is the greater third, as above, the C. is a major chord; but when the lowest third is the lesser,

thus: the C. is called a minor chord. A chord of two minor thirds com-

bined is called diminished, as the interval from the lowest note to the highest is less than

a perfect fifth, thus: The common C. admits of two inversions, accord-

ing as one or other of its notes is made the bass, or lowest note of the C., thus:



Fundamental Chord. 1st inversion. 2d inversion.

By adding another third above the common C., a C. of four parts is produced, which is called the chord of the seventh, because the highest note is a seventh above the bass. When the C. of the seventh is produced on the fifth of the scale, it is then called the dominant seventh, which is the most perfect species of the C. It then consists of a major third, perfect fifth, and minor seventh, which is the next harmonic produced by nature above the fifth. The C. of the seventh may also be formed on any of the notes of the major or minor scale taken as a bass note, which produces the varieties of major, minor, and diminished sevenths, thus:



Dominant 7th. Major 7th. Minor 7th. Diminished 7th.

The C. of the seventh admits of three inversions, according as the notes above the fundamental note are used as bass notes. From its nature, it requires a resolution, and is therefore always followed by a common C. whose fundamental bass is a fifth below that of the seventh. For the C. of the ninth, see HARMONY. The first proper arranged system of chords is by Rameau, in 1730, which has from time to time been extended and improved by Marpurg, Kirnberger, G. Weber, F. Schneider, Marx, and the late professor S. W. Dehn of Berlin.

**CHOREA** (Gr. *choria*, a dancing or jumping), a disease popularly called St. Vitus's dance, and consisting of a tendency to involuntary and irregular muscular contractions of the limbs and face, the mind and the functions of the brain generally being quite unaffected. The spasms of C. differ from those of most other convulsive affections in being unaccompanied either by pain or by rigidity; being, in fact, momentary jerking movements, indicating rather a want of control of the will over the muscles, than any real excess of their contractions. In some cases, the disease resembles merely an exaggeration of the restlessness and "fidgetiness" common among children; in others, it goes so far as to be a very serious malady, and may even threaten life. Fatal cases, however, are fortunately very rare, and in the large majority of instances the disease yields readily to treatment carefully pursued, or disappears spontaneously as the patient grows up. C. is a disease much more common among children of 6 years old, and upwards, than at any other period of life; it is also more common among female children than among males. The treatment generally pursued is the use of metallic tonics, such as zinc, copper, iron, and arsenic (the last, perhaps, the best), sometimes preceded or accompanied by purgatives. Exercise in the open air is also to be recommended; and gymnastics afford material aid in the cure. It is to be observed that the name St. Vitus's dance (dance of St. Weit) was applied originally in Germany to a different form of disease from that above referred to—one closely approaching in its characters the epidemic "dancing mania," which, in Italy, was called tarantism (q.v.).

**CHOREA SCRIPTORUM.** See SCRIVENER'S PALSY.

**CHOREE.** See METRICAL FEET.

**CHOREPI-COPI**, an order of ministers of ancient origin, whose functions were to assist city bishops in rural districts or remote places. They acted in a subordinate capacity, and possessed limited powers, acting as colleagues or vicars of the bishops. They possessed the privilege of attending councils in their own right, and not merely as substitutes for bishops. At first they were confined to the eastern church, but began to multiply in the western church in the 5th century. They were succeeded after the 10th c. by archdeacons, vicars-general, and rural deans. In the east the order was abolished by the council of Rodicea about 365 A.D.

**CHORIAMBUS.** See METRICAL FEET.

**CHORLEY**, HENRY FOTHERGILL, 1808-72; an English author who paid much attention to musical criticism. After long effort he got a position on the London *Athenaeum*, and for 35 years conducted the musical department of that journal. He wrote on other subjects besides music, producing the librettos of the *Amber Witch*; the *May Queen*; *St. Cecilia*; *Kenilworth*; *The Sapphire Necklace*; and *Faust*. Other of his works are. *Conti the Discarded*, and *Other Tales*; *Sketches of a Seaport Town*; *Memorials of Mrs. Hemans*; *Lion, a Tale of the Coteries*; *Music and Manners in France and Germany*; *Pomfret*; *Criticisms on Modern German Music*; and *Thirty Years' Musical Recollections*.

**CHOROID COAT.** See EYE.

**CHORUS**, among the ancients, meant a band of singers and dancers employed on festive occasions of great pomp, and also in the performance of tragedy and comedy

on the stage. In the time of the Attic tragedy, the C. consisted of a group of persons, male and female, who remained on the stage during the whole performance as spectators, or rather as witnesses. When a pause took place in the acting, the C. either sang or spoke verses having reference to the subject represented, which served to increase the impression or sensation produced by the performers. At times, the C. seemed to take part with or against the persons in the drama, by advice, comfort, exhortation, or dissuasion. In early times, the C. was very large, sometimes consisting of upwards of fifty persons, but afterwards it was much reduced. Its leader was termed the coryphæus. The charge of organizing it was considered a great honor among the citizens of Athens. The person appointed for this purpose was called the *choragus*. The honor was very expensive, as the choragus had to pay all the expenses incurred in training the members of the C. to perform their parts efficiently. They were, besides, fed and lodged by him during training-time, and he had also to provide for them masks and dresses. At times, the C. was divided, and spoke or sang antiphonally. These divisions moved from side to side of the stage, from which movement originated the naming of the single songs or stanzas, such as strophe, antistrophe, and epode. How the musical element of the ancient C. was constituted or composed, is not known with any certainty. Possibly, it was only a kind of rhythmical declamation, and doubtless very simple. It was accompanied by flutes in unison. With the decline of the ancient tragedy, the C. also fell into disuse; and only lately has there been an attempt to produce the same on the stage in the manner of the ancients, as, for example, in Schiller's *Bride of Messina*. The music which has been set in modern times to some of the Greek tragedies, does not give the least idea of the original music.

In modern times, by C. is understood the union of singers or musicians for the joint performance of a musical work. C. is also the name given to a musical composition for numerous voices, either with or without accompaniment, and intended to express the united feelings of a multitude. The musical C. is the only artistic means by which a simultaneous movement or sentiment of a multitude can be represented in the drama, the language or text being always of a simple rhythm, permitting only of a limited movement suited to the combination of a multitude. It is, however, not always necessary that every part of the C. should manifest the same feeling or sentiment. Two or more parts of the C. may act against each other, as suits the purpose of the drama. Double, triple, and quadruple choruses are found in the old Italian compositions for the church. In modern times, the C. is much used, and with great effect, in operas, especially those of Meyerbeer and Wagner. In oratorio, the C. is of the greatest importance, and the numbers now employed to sing the C. far exceed anything attempted a century ago; but this is not always an advantage, for the *tempi* must necessarily be taken much more slowly, which has a sluggish effect; while increase in the number of voices does not always produce a greater power of sound. The C. of 35 well-trained voices from the pope's chapel, who sang at the coronation of Napoleon I., in the cathedral of Notre Dame, Paris, produced a far greater and more wonderful effect when they entered singing the *Tu es Petrus*, than another C. of hundreds of voices, and 80 harps, that had been assembled and trained for the same occasion, in expectation of surpassing all that man could imagine. The greater the number, the greater is the difficulty in obtaining unity.—C., in organ-building, is the name given to stops of the mixture species, some of which contain 2, 3, 4, 5, 6, or more pipes to each note, tuned at consonant intervals in relation to the fundamental stops.

**CHOSE IN ACTION**, in the law of England, is that kind of property which consists not in possession, but in the legal right to possess. As this right can, in general, be vindicated and made available only by means of an action, the property to which it relates, whether real or personal, is called a thing (*res* or *chose*) in action, to distinguish it from a thing already in possession. Money due upon bonds and bills, goods bought and not yet delivered, are examples of choses in action, as is also the right to compensation for damage occasioned by breach of contract. "By the strict rule of the ancient common law, no chose of action could be assigned or granted over, because it was thought to be a great encouragement to litigiousness, if a man were allowed to make over to a stranger his right of going to law. [See CHAMPERTY.] But this nicety is now not so far regarded as to render such a transaction really ineffectual. It is, on the contrary, in substance, a valid and constant practice; though, in compliance with the ancient principle, the form of assigning a chose in action is in the nature of a declaration of trust, and an agreement to permit the assignee to make use of the name of the assigner, in order to recover possession. . . . The king is an exception to this general rule, for he might always either grant or receive a chose in action by assignment." The law relating to choses in action was formerly the same in the U. S. as in Eng. But in many states, as in N. Y., the assignee of a chose in action is now allowed to sue upon his right in his own name. The assignee of a chose in action, however, takes it subject to all defenses which might have been interposed to it had the action been brought upon it by the original owner.

**CHOSON.** See COREA.

**CHOSROES.** See KHOSRU.

**CHOTA NAGPORE**, or NAGPORE THE LESS, a division of Bengal, British India. The area of the division is 26,906 sq. m., and in 1891 the pop. was 4,628,792. It con-

tains five districts, and in the w. or s.w. part is occupied by several minor tributary states. The inhabitants of this region are semi-barbarous, but there are many traces of an early civilization. The country is for the most part wild and hilly, consisting of an undulating plateau 3,000 ft. above the sea. Its chief products are coal, jute, tea, and indigo; iron is also found.

**CHOTEAU**, a co. in Montana, on the Canadian border, near the head-waters of the Missouri river, drained by the Missouri, the Dog, Milk, Arrow, Teton, Judith, Bear, and other rivers; about 27,280 sq. m.; pop. '90, 4781, besides Indians. Co. seat, Fort Benton.

**CHOTEAU**, a co. in northwestern S. Dakota; 870 sq. m.; pop. '90, 8. It is drained by affluents of Moreau river.

**CHOTYN**, **KHOTIN**, or **CHOCZIN**, a t. in Bessarabia, on the river Dniester, 45 m. s.w. of Kamieniec; pop. about 21,000. It is a fortified military post, and once belonged to the Turks, but was taken by the Russians in 1789.

**CHOUANS** were bands of insurgent royalists, who, during the French revolution, organized a reactionary movement in Brittany. They obtained their name from their leader, Jean Cottureau. This person, who had been a smuggler, went by the name of Chouan—a corruption, it is said, of *chat-huant* ("screech-owl")—because, while he and his accomplices were engaged in their nocturnal work, they were wont to be warned of their danger by some one on the watch imitating the cry of this bird. At the period of the revolt, however, he followed the humble occupation of a clog-maker. The first indications of an anti-revolutionary spirit in Brittany manifested themselves in the beginning of 1791, when several trees of liberty were destroyed at night, and other more serious outrages committed. These disturbances were fomented by seditious priests. In 1792, an insurrection was planned by the marquis de la Rouarie, with the sanction and approval of the two brothers of Louis XVI. The agents of the marquis entered into communications with Jean Cottureau—well known for the reckless audacity of his character—and other smugglers; but having the misfortune to be arrested, the carrying out of the insurrection devolved upon the latter. The *Chouannerie*, as the insurrection was called, at first disgraced itself, both by the drunken license and the cruelty which marked it. After several successful exploits of the guerrilla sort, Jean Cottureau perished in an engagement which took place on the 28th July, 1794, near the wood of Misdon, the theater of his first efforts. Before this, however, other and more illustrious leaders had appeared in Brittany to direct the movement, the chief of whom were Georges Cadoudal (q.v.) and Charette. Through their endeavors it was more widely extended, and for a time seemed likely to imperil the security of France, but was suppressed towards the close of 1799. Petty *spurts* of insurrection, however, broke out till about 1808, when the *Chouannerie* ceased for awhile. In 1814–15, it again made its appearance on both sides of the Loire; and after the July revolution, was once more excited by the duchess of Berry on behalf of the duke of Bordeaux, but crushed by the energetic measures taken by M. Thiers, in 1830.

**CHOUGH**, *Fregilus*, a genus of birds of the crow family (*corvidæ*), but approaching to the characters and appearance of the starlings (*sturnidæ*). The length of the bill has induced some naturalists, among whom was Cuvier, to place them beside the hoopoes' but this is now generally regarded as an error; they agree with crows in having their nostrils covered with stiff bristles directed forward, and in their habits. The beak is longer than the head, strong, arched, and pointed. The tail is slightly rounded. The only European species is the common C., sometimes called the Cornish C., or red-legged crow (*F. graculus*), a widely distributed but very local bird, inhabiting the Swiss Alps, the high mountains of Spain, of Greece, of India, and of Persia, the s. of Siberia, the n. of Africa, and some parts of the British sea-coasts; but almost exclusively confined to situations where there are high cliffs. In these it generally makes its nest; sometimes, however, in ruined towers. Its long hooked claws enable it to cling easily to a rough rock, but it seems unwilling even to set its feet on turf. It lives in societies like the rook. It feeds on insects, berries, grubs, and grain. It is easily tamed, becomes very familiar and forward, and exhibits in the highest degree the curiosity, the pilfering disposition, and the delight in brilliant or glittering objects, which also characterize others of the crow family.—Other species of C. are known, natives of Australia, Java, etc. See *illus.*, DEER, ETC., vol. IV.

**CHOULES**, JOHN OVERTON, D.D., 1801–56; a native of England, who emigrated to the United States in 1824. In 1827, he became minister of the Second Baptist church in Newport, R. I. Six years later, he went to New Bedford; in 1837, to Buffalo; in 1841, to the Sixth street Baptist church in New York; and in 1843, to the church at Jamaica Plain, near Boston. In 1847, he returned to his Newport church; and in 1854, accompanied Commodore Vanderbilt in his yacht voyage to Europe. Among his publications are *Young Americans Abroad*, and *The Cruise of the North Star* (the commodore's yacht). He also contributed to and edited several historical works.

**CHOUTEAU**, AUGUSTE, 1739–1829; a native of New Orleans, and a pioneer in north-western settlements. With his brother Pierre he was the founder of the present city of St. Louis.

**CHOUTEAU, PIERRE**, 1749-1849; brother of Auguste, and with him the founder of St. Louis, where they settled in 1764. The two were members of an expedition under Laclede, sent by the French government of Louisiana to open trade in the region of the Missouri and upper Mississippi. The brothers remained in St. Louis all their lives, Auguste reaching 90 and Pierre 100 years of age. They were the heads of large families of high standing and great wealth and influence in Missouri and adjoining states.

**CHOUTEAU, PIERRE**, 1789-1865; son of Pierre the founder of St. Louis. He was all his life engaged in the fur trade, following the Indian tribes as they retired before white encroachment, and establishing trading-posts in many remote points. In 1834, he and his associates bought the fur-trade interests of John Jacob Astor, and extended their operations over all the regions e. of the Rocky mountains down to Mexico. Chouteau was a member of the convention that framed the first constitution of Missouri.

**CHOWAN**, a co. in n.e. North Carolina, on Albemarle sound, and bounded w. by Chowan river; 220 sq.m.; pop. '90, 9167, includes colored. The surface is uneven, and the soil fertile, producing corn, cotton, etc. Co. seat, Edenton.

**CHOW-CHOW** (strictly an adjective, meaning "mixed," "miscellaneous," "broken"), a name most commonly used to denote a kind of mixed pickles, made originally in the East Indies, but now imitated elsewhere. Among its principal ingredients may be mentioned pickles, onions, cauliflower, and beans, all of which are steeped in mustard. A kind of Chinese sweetmeats, consisting of odds and ends of orange peel, ginger, bamboo, syrup, pumelo rind, etc., is called chow-chow.

**CHOWDER**. In the fishing villages of Brittany (according to a writer in *Notes and Queries*, 4, Ser. VII., 85), *faire la chaudière* is to provide a caldron in which is cooked a mess of fish and biscuit with some savory condiments—a hodge-podge contributed by the fishermen themselves, each of whom in return receives his share of the prepared dish. The French would seem to have carried this practice to America, first to Newfoundland, whence it spread to Nova Scotia, New Brunswick, and New England. Chowder is described nowadays as "a many-sided dish, of pork and fish, potatoes and bread, onions and turnips, well peppered and salted, piled up in layers and stewed together." Cider is sometimes added. New Englanders are not alone in their appreciation of this dish. Picnic parties to the seashore not unfrequently prepare a chowder from clams or fish which they catch themselves. Such a picnic is itself called a *chowder*. The best known form of chowder is *clam chowder*, so called because clams form one of the principal ingredients. Another variety is *cal chowder*. See Schele De Vere's *Americanisms*, page 844.

**CHRESTOMATHY**, a collection of extracts, or text books, useful in learning a language, or in gaining special information.

**CHRISM** (Gr. *chrisma*, ointment) is the name given to the oil consecrated on holy Thursday, in the Roman Catholic and Greek churches, by the bishop, and used in baptism, confirmation, orders, and extreme unction. There are two kinds of C.—the one, a mixture of oil and balsam, is used in baptism, confirmation, and orders; the other, which is merely plain oil, is used in extreme unction.

**CHRISOME**, the name of the white vesture laid by the priest on the child in former times at baptism, to signify its innocence. It was generally presented by the mother as an offering to the church, but if the child died before the mother was "churched" again, it was used as a shroud. By a common abuse of words, C. came to be applied to the child itself. A C. child is a child in a C. cloth.

**CHRIST**, a title of our Savior (see *JESUS*), now in general use almost as a name or as part of his name. It is originally Greek, signifies *anointed*, and corresponds exactly in meaning and use with the Hebrew word *Messiah* (q.v.); so that this title given to Jesus of Nazareth, is an acknowledgment of him as the Savior long promised to the house of Jacob and to the human race. As prophets, priests, and kings were anointed on being called to their several offices (I Kings i. 34, 39; I Sam. xvi. 13; Exod. xxix. 7), so the Savior was anointed as at once prophet, priest, and king; the Holy Spirit, often represented under this figure, being given to him to qualify his human nature for all that belonged to his mediatorial office and work.

The whole system of Christianity depends on the doctrine of the PERSON OF CHRIST. An essential difference necessarily exists on almost every point between the systems of doctrine maintained by those who do and by those who do not acknowledge a union of the divine and human natures in his person. Some of the early heretics maintained an opinion, which has long ceased to have any supporters, that the body of C. was not a real body, but a mere visionary appearance. See DOCTRINE and Gnostics. The opposite extreme is that of Socinians, by whom C. is regarded as a mere man; whilst Arians (see *ARIUS*) regard him as in his *pre-existence*—i.e., before his *incarnation*—the highest of all created beings; and according to the generally received doctrine of Christians, he is "God and man in two distinct natures and one person." This doctrine, of course, bears a most intimate relation to that of the Trinity (q.v.); and all who hold the divinity of Jesus Christ, regard him as the incarnate second person of the godhead. The proof of the whole doctrine may almost be said to consist simply in a proof of the *divinity* of C.; his real *humanity*, although equally important, being no longer disputed. And this

proof is found, not so much in particular texts which directly assert the divinity of C.—although such texts are important—as in the multitude of texts which imply it, and admit of no reasonable or natural explanation apart from it; and in showing that certain doctrines are taught in Scripture which cannot be maintained without this.

The ancient Apollinarians, Eutychians, Monophysites, etc., regarded C. as having only one nature—a *compound* of the divine and human; but such a notion as that C. had only a human body, the divine nature supplying the place of a soul, is held to be subversive of the whole Christian system; and his human nature, to be real, must be viewed as consisting both of a true body and a true soul. His human nature never existed, however, apart from his divine nature, and was “conceived by the power of the Holy Ghost.”

Closely connected with this subject is that of the *humiliation* and consequent *exaltation* of C., in his character of mediator between God and man; a subject, to the former branch of which belongs the whole doctrine of the *work* of C. for the redemption of sinners, including the great doctrine of atonement (q.v.). To the latter belongs the doctrine of the reward of his work, in his sitting at the right hand of God, and having all things put under his feet; not only exercising dominion as king in his church, but over all things for the advancement of the salvation of his church, and of every member of it; while also he sends forth the Holy Spirit to apply to men the blessings which, as the reward of his work, he has mediatorially obtained for them; and still continuing to act as a priest, makes continual intercession (q.v.), founded upon his work and sacrifice.

**CHRIST, ORDER OF, IN PORTUGAL.** When the Templars were expelled from France, and their property confiscated by Philippe le Bel, with the sanction of Pope Clement V., they were received into Portugal, and their order revived in 1317, under the title of “The Order of our Lord Jesus Christ.” With some difficulty, Pope John XXII. was induced to sanction the new order. The knights of the order of Christ joined the Portuguese in all their crusades against the infidel, and also in their African and Indian expeditions, receiving in compensation continual additions to their own possessions. The grand prior of the order was invested by pope Calixtus III. with power equal to that of a bishop; and as an encouragement to adventure, the knights were promised all the countries which they might discover, to be held under the protection of Portugal. At length, their wealth and power excited the jealousy of the kings of Portugal; their future acquisitions, and, subsequently, even their actual possessions, were declared to be crown possessions, and the offices of administrator and grand-master were transferred to the crown. A fine cloister belonging to the order is still to be seen at Tomar, to which place the seat of the order was transferred from Castro-Marino in 1366. Noble descent, and three years’ military service against the infidel, were required for admission. The members took the three monkish vows of chastity, poverty, and obedience, till the pope released them from the first two, on condition of their applying the third part of their revenues to the support of Tomar cloister, the priests of which were bound by the three vows. This cloister is now a theological institution for the instruction of the priests of the order.

It is said that the order still possesses 26 villages and farms, and 484 prebends. It is very numerous—consisting of 6 knights of the grand cross, 450 commanders, and an unlimited number of knights. Catholics of noble descent alone are admitted, and foreigners are excluded from participation in the revenues, being exempted in return from its rules.

**CHRIST, PAPAL ORDER OF.** This is a branch of the Portuguese order, created by Pope John XXII. It has only one class.

**CHRIST, PICTURES OF.** To represent the form and countenance of C. in a manner that shall even approximate to the latent ideal in the minds of men, is unquestionably the most sublime and the most difficult work which an artist can undertake. It is the highest pictorial effort of the creative faculty. From a very early period in the history of the church, we can trace the growth of the endeavor. At first, indeed, the horror entertained for the idols of the pagans, must have inspired Christians with an aversion to images or pictures of the Savior. Gradually, however, as paganism disappeared, and time removed C. further from his people, this feeling would subside, and the longing would arise to possess some representation of him on which the eye might rest with pious delight. When Christian art originated we cannot precisely say; it is usually dated from the time of Constantine. Nevertheless—as lord Lindsay remarks, in his *Sketches of the History of Christian Art* (Lond. 1847)—“it would be more correct to say that it then first emerged above ground; its earliest efforts must be sought for in the catacombs.” In these subterranean excavations, forming a maze of unknown extent and labyrinthine intricacy, to which the Roman Christians had recourse in the days of persecution, are to be found the first traces of Christian sculpture and painting. The *sarcophagi* of the martyrs and confessors, of the heroes and heroines, of the bishops, and, in general, of those of higher mark and renown, were painted over with the symbols and devices of Christianity. The parables were the chief source from which these sepulchral artists drew their symbols. C. is painted as the good shepherd in the midst of his flock, or, with “pastoral pipe,” seeking the lost sheep, or returning with it on his

shoulders. Sometimes he figures as an ideal youth in the bloom of his years, sometimes as a bearded man in the prime of life, sometimes as Orpheus surrounded by wild beasts enrapt by the melody of his lyre. Such pictures, however, were only *symbolical*, and did not satisfy the religious craving for a *portrait*. The age of Constantine marks the transition from the symbolical to the *pseudo-historical* picture. We now find C. represented in the midst of his disciples, or in the act of performing a miracle; but it is not till about the close of the 4th c. that we actually encounter that type of countenance which, with certain modifications, continued to rule the conceptions of artists during the whole of the middle ages. To vindicate this type, myths, at a later period, sprang into existence; and we read of a portrait of C. possessed by King Abgarus of Edessa, and imprinted on a handkerchief, and of another miraculously obtained by St. Veronica at the crucifixion; but there is as little foundation for these legends as for that which attributes to the evangelist Luke such a picture. The emperor Alexander Severus (230 A.D.) is said to have possessed in his palace an image of Christ. An antique mosaic, probably of the 8d c., which exists in the *Museo Cristiano* of the Vatican—where are to be found also some specimens of the frescos of the catacombs—gives an idea of the manner in which the heathen artists expressed their notion of Christ. He is depicted as a bearded philosopher in profile. A letter which Lentulus, the predecessor of Pilate, is declared to have written to the Roman senate, but which is evidently apocryphal, attributes to C. a figure and countenance of manly beauty. Towards the middle of the 8th c., John of Damascus gives a description which he pretends to have gathered from more ancient authors. According to him, C. was tall, had beautiful eyes, but the eyebrows meeting; a regular nose, flowing locks, a black beard, and a sandy or straw-colored complexion, like his mother. Among the most ancient representations of C. which profess to be portraits, are the two paintings in the Calixtine and Pontine catacombs near Rome, and which are given in Arighi's *Roma Subterranea Nova*. The Savior is there represented with an oval visage, a straight nose, arched eyebrows, and high forehead. The expression is earnest and mild; the hair is parted on the forehead, and falls over the shoulders in waving locks; the beard is short and scattered. These two busts agree with the apocryphal letter of Lentulus, and the artist or artists who executed them, may possibly have employed it as a model. The majority of the Byzantine and Italian painters, down to the age of Michael Angelo and Raphael, adhered to this type.

**CHRIST** or **CRIS CROSS** ROW, the alphabet arranged in the form of a cross, for the use of children; and so printed, in old "horn" books, or primers. The letter A was at the top, and Z at the foot of the cross. See **HORNBOOK**.

**CHRISTADELPHIANS**, a religious sect in America, organized about 1844, whose principles are thus stated: The Old and New Testaments are equally important; God will restore to immortal life all who love him in this life, but those who have not accepted this immortal principle cease to exist at death; there is no personal devil; Christ is the son of God, deriving from the Deity moral perfection, but from his mother a human nature; he has the threefold character of prophet, priest, and king; the first office he fulfilled by his life and death on earth, and now as priest he mediates before the deity; as king he will return to earth and reign over all the world from the throne of David. In 1890 they had in the United States 63 organizations and 1,277 members.

**CHRISTCHURCH**, a parliamentary and municipal borough and seaport on the English channel, in Hampshire, at the head of the estuary formed by the Avon and Stour, 24 m. s.w. of Southampton. It has manufactures of fusee chains for clocks and watches, and of hosiery. It has also a salmon-fishery. The priory church, one of the most interesting and magnificent of English ecclesiastical structures, dates from the reign of William Rufus, and was restored in 1861. A battery of artillery is generally stationed in the commodious barracks. The borough comprises two favorite watering-places, Muford and Bournemouth. There are traces here of a Roman temple to Mars. Pop. of parliamentary borough, '91, 53,300. It returns one member to parliament.—C. bay has a double tide every 12 hours.

**CHRISTCHURCH**, capital of the province of Canterbury, in New Zealand, situated on the river Avon, about 8 m. from the sea. Its port is Littleton, with which it is connected by a railway, and it is in railway communication with the n. and s. It is the center of a great grazing district, and has also flourishing manufactories. There is a large export trade, chiefly in timber and wool. The city possesses numerous fine public buildings, churches, theater, etc. Pop. '91, 16,200, with suburbs, 31,600.

**CHRIST-CHURCH, THE CATHEDRAL OF** (Oxford). This great society has had three distinct foundations. In 1526, Cardinal Wolsey obtained from Clement VII. a bull for the suppression of 22 monasteries, the site of one of which he selected as the site of a new college, to be called cardinal college, and which he intended to endow on a scale of magnificence beyond that of any other foundation in Oxford. On the fall of Wolsey in 1539, the whole establishment came into the hands of King Henry VIII. In 1583, that prince refounded it under the name of King Henry VIII.'s college, and in 1646 he once more re-established the college, under the name of "Christ-church cathedral in Oxford, or the foundation of King Henry VIII., with a dean and 8 canons, 60 students, 40 school-boys, clerks, choristers," etc. This foundation is now subsisting, though it has under



gone considerable modifications. To none of the canonries were any duties assigned by King Henry VIII. From time to time, however, the canonries have been annexed to various university professorships, more particularly one to the professorship of divinity, by King James I.; one to the professorship of Hebrew, by King Charles I., and one to the professorships of ecclesiastical history and pastoral theology respectively, by Queen Victoria.

Several changes were introduced by the commissioners appointed under 17 and 18 Vict. c. 81. There is now only one sinecure-enjoying canon. When he is off the list, no one may hold a canonry save a professor, the archdeacon, or the sub-dean. The studentships are now 80 in number, and are, as before, divided into junior and senior studentships, differing considerably as to emolument. All these are now open, the old system of appointment by nomination having been abolished. About three junior students are elected every year in Lent term, one in every three for excellence in mathematics or physical science; and besides these, three are sent up yearly from Westminster. The senior studentships are also open, with the usual limitation of independent income. Of these, however, only a third can be held by laymen. The studentships were very poor; but an improvement in this respect has been included among the recent changes. Some valuable exhibitions, however, and 90 benefices, are in the gift of the society. In 1875, there were about 1150 names on the college books. No statutes were given to C., owing to the death of the king having taken place shortly after the final foundation of the college. It was, in consequence, entirely governed by the orders of the dean and chapter, to the total exclusion of the tutors. To this separation of the governing from the teaching body was due its slight repute in the schools.

**CHRISTIE ELEANOR.** See **MASS.**

**CHRISTENING**, a term often used as equivalent to baptism (q.v.). It is disliked by some, and of course liked by others, as favoring the doctrine of baptismal regeneration; being, indeed, according to its derivation, expressive of the notion that a person is *made a Christian* in baptism. But, like many other terms, it is frequently employed without reference to its origin, and without any intention of conveying the opinion which it might be strictly held to imply.

**CHRISTIAN**, a co. in central Illinois, traversed by the Illinois Central and other railroads. Pop. '90, 80,531. Co. seat, Taylorville.

**CHRISTIAN**, a co. in s.w. Kentucky, on the Tennessee border, intersected by the Louisville and Nashville railroad; 708 sq. m.; pop. '90, 4118, includ. colored. It is hilly in the n., but level in the s., with productive soil; the products are wheat, corn, hay, butter, wool, and tobacco. Co. seat, Hopkinsville.

**CHRISTIAN**, a co. in s.w. Missouri, drained by James river, and intersected by the St. Louis and San Francisco railroad; 556 sq. m.; pop. '90, 14,017, including colored. Co. seat, Ozark.

**CHRISTIAN II.**, King of Denmark, Norway, and Sweden, b. at Vyborg, in the island of Funen, 2d July, 1481. He ascended the throne of Denmark in 1513. Shortly after his marriage in 1515, with a sister of the emperor Charles V., a young Norwegian peasant-girl, with whom C. was in love, died, or, as it was believed, was murdered. That natural ferocity, for which C. was surnamed the *Angry*, burst forth most furiously on this occasion. He caused the governor of the castle, Torben Oxe (see **DYVEKÉ**), to be beheaded. He afterwards declared open war against Sweden, took Stockholm through fraud, and had himself crowned king. But the cruel vengeance and treachery of C. after this event excited the indignation of that country, which, headed by Gustavus Vasa (q.v.), succeeded in driving out the Danes, liberating itself from the yoke of the house of Kalmar, and finally electing Gustavus Vasa (in 1523) to the throne. In Denmark, too, the aristocracy had risen, and an insurrection in Jütland following, C. found himself forced to flee for refuge to the Netherlands, and his uncle Frederick I. (q.v.), the introducer of the reformation into Denmark, elected king in his place. Encouraged, however, by the Catholic party in the Netherlands, and assisted by Charles V., C. landed successfully in Norway in 1531; but at the battle of Aggerhuus in 1532, he was totally defeated, and made prisoner in the castle at Sonderburg, from which he was liberated after 12 years of confinement. He died 25th Jan., 1559.

**CHRISTIAN IV.**, King of Denmark and Norway, and duke of Schleswig-Holstein, b. in Zealand, 12th April, 1577, and elected successor to the throne in 1580. He assumed the scepter in 1598. From 1610 he carried on a successful war, known as the Kalmarian war, against Charles IX. of Sweden, and his successor, Gustavus Adolphus, which ended in an advantageous peace in 1618. As leader of the Protestants in the thirty years' war, C. was not successful. His labors for the improvement of his country, in which he was indefatigable, were, however, most beneficial. He strengthened its maritime power; extended its commerce as far as the East Indies, where he obtained the inland trade of the country. His legislative and financial reforms, added to his love and patronage of the arts and sciences, gained for him the esteem of his people, especially of the learned. He died in 1648.

**CHRISTIAN VII.**, King of Denmark, son of Frederick V. and Louisa of England, b. 29th Jan., 1749. He succeeded to the throne of his father 14th Jan., 1766, and in the same year married Caroline Matilda, sister of George III. of England. The dissipation of his early life had enfeebled his energies, and his ministers, headed by count Bernstorff, assumed control. Bernstorff was supplanted by Struensee (q.v.), whose influence over the king and queen, added to his unpopularity, led the queen dowager and her son, afterward Frederick VI. (q.v.), to plot against him. Bernstorff was recalled; the incapacitated king now governed only nominally, and in 1784 Frederick ascended the throne as joint regent with his mother. O. d. Mar. 13, 1806.

**CHRISTIAN VIII.**, 1786-1848; King of Denmark, nephew of Christian VII. When Norway was ceded to Sweden by the treaty of Kiel, the people of the former country repudiated the transfer, and C. was then made governor, raised an army and convened a diet, at which a constitution was framed, and he was elected, May 29, 1814, king of Norway under the title of Christian I., but the allied powers compelled him to relinquish the throne on the 10th of Oct.

**CHRISTIAN IX.**, King of Denmark, was born in 1818. By the protocol of London, issued in 1852, the succession to the crown was vested in him, and he ascended the throne in 1863. In 1874, on the occasion of the 1000th anniversary of the existence of Iceland as a nation, he granted a new constitution, visiting Iceland in person at the time of its coming into operative power. He is the father of the Princess Alexandra of Wales, King George of Greece, and the dowager empress of Russia.

**CHRISTIAN BROTHERS.** See SCHOOLS (BROTHERS OF CHRISTIAN).

**CHRISTIAN COMMISSION.** THE UNITED STATES, an important organization in the northern states during the late civil war, to aid and co-operate with the sanitary commission, and generally to assist in the cause of the union. Its purpose was to supply material wants and comforts for the army, especially to the sick or wounded. It gave also an unsectarian religious help. Like the sanitary commission, it accomplished a vast amount of valuable work. The C. C. was originated by a call from the Young Men's Christian association of New York. It is noticeable as one of the earliest signs, as well as causes, of the growing charity among different denominations so marked in recent years. See *Annals of the Christian Commission*, by Moss.

**CHRISTIAN CONNECTION**, or more properly **CHRISTIANS**, an organization of Christians originating near the close of the 18th century. The first organizations were in Virginia, composed of minister and churches seceding in 1793 from the Methodists under the leadership of James O'Kelly. At first they were known as "Republican Methodists," but in 1794 in Lebanon Church, Surrey county, Va., they adopted the name "Christian" to the exclusion of all others, Rev. Rice Haggard having made the motion. In 1801, Abner W. Jones, M.D., a minister in the Baptist Church in Vermont withdrew therefrom and organized an independent church at Lyndon, Vt., which soon accepted the name Christian. At about this time there was a secession from the Presbyterians of Kentucky, largely growing out of the "Cane Ridge Revival." A separate presbytery was formed, but soon dissolved, and the churches took the name "Christian." These three organizations soon merged into one under the one name, and rapidly spread into all parts of the U. S. and Canada. In 1854 there occurred a division on the question of slavery, and the southern churches declined further affiliation with the northern ones. Within the last few years the separate churches have been drawn together by mutual interest until virtually there is now no division. The southern delegates are entitled to seats in the American Christian Convention. Their central idea is, that the church of Christ is one, and embraces all who are truly believers in him; and that the organized church should be so constituted, named, and governed as to welcome to its fellowship any who are truly Christians and "walk in newness of life." Each congregation is independent, and the Bible is the standard of faith and practice. They hold that the Scriptures are inspired and are of divine authority. They grant to every one the right of private interpretation, and hence differences of theological views do not bar church fellowship. They hold that there is one God, the Father; that Christ is a divine being, and is the mediator between God and man; that the sufferings of Christ atone for the sins of all men, who, by repentance and faith, may be saved; that immersion is the proper form of baptism (though in this the individual conscience should be respected), and believers are the only proper subjects for that ordinance; that communion at the Lord's table is open to all believers. In government and usage they are congregational.

The American Christian Convention, in which all the local conferences have representation, and through which missionary and educational interests are carried forward, meets every four years. It has a constitution, is incorporated, and has regular departments under the direction of department secretaries. The Southern churches also have a general convention, as does New England. They have institutions of learning as follows: Starkey college, at Eddytown, N. Y.; Christian Biblical Institute, Stanfordville, N. Y.; Elon college, Elon, N. C.; Union Christian, Merom, Ind.; LeGrand College, LeGrand, Mo.; Kansas Christian college, Lincoln, Kans.; Weaubleau Institute, Weaubleau, Mo.; Franklinton college (for colored people), Franklinton, N. C. and the Correspondence college, of which Rev. M. Summerbell, D.D., Ph.D., is president. Antioch college was founded by the "Christians," but they have not continuously had control of it. In 1897 there were reported 1384 churches, 1372 ministers, and 120,000 communicants. The denomination is carrying forward home and foreign missionary interests

with zeal and success, has a publishing house at Dayton, Ohio, and continues the publication of the *Herald of Gospel Liberty*, begun in 1808. Besides this, there are several other publications of note and merit.

**CHRISTIAN ENDEAVOR, SOCIETY OF**, the name adopted by a society formed in the Williston Cong. church, Portland, Me., Feb. 2, 1881, and subsequently adopted by similar organizations and by the United society. The Young People's S. of C. E., as the local body is usually termed, aims to train young people for the membership and duties of the church by means of pledged and constant work. The constitution, which is flexible according to the needs of each local church, insists primarily upon attendance on and participation in the weekly meeting for prayer. Consecration meetings, "lookout," prayer meeting, and social committees are other factors. Other committees are optional; but the purely religious features must be paramount. Its motto is, "For Christ and the church," and its spirit undenominational. Societies exist in all evangelical denominations, in nearly every Protestant country, and in all missionary lands. The first convention was held at Portland, June 2, 1882; in Oct., 1883, the United society was formed, and subsequently was chartered under the laws of the state of Maine. The first state union formed was that of Connecticut, in 1886. In 1896 there were 4,000 societies, including 8000 societies in foreign lands, and a membership of 2,800,000. The Pres. of the United society is Rev. F. E. Clark; the official organ, the weekly newspaper, *The Golden Rule*. A similar organization, the **EPWORTH LEAGUE**, has been formed within the Methodist Episcopal Church.

**CHRISTIAN ERA**, sometimes called the era of the incarnation, is now almost universally employed in Christian countries, and is used by some eastern nations. Its epoch, or commencement, is the 1st of Jan. in the fourth year of the 194th olympiad, the 753d year from the foundation of Rome, and the 4,714th of the Julian period. It is usually supposed to begin with the year of the birth of Christ, but there are various opinions with regard to the year in which that event took place. The general opinion seems to be that Christ was born four years earlier than the dates now used imply. The C. E. was introduced into Italy in the 6th c., and began to be used in Gaul in the 8th c., though not generally used in England before the close of the 8th century. Before its introduction the usual practice in Latin countries was to distinguish the years by their number in the indiction. In the C. E. the years are distinguished by Arabic numerals, those before the birth of Christ being marked B.C. (before Christ), or A.C. (*ante Christum*); and those after Christ A.D. (*anno Domini*, in the year of our Lord). There is difficulty in determining the years before Christ, since astronomers reckon the year preceding our era as the year 0 B.C., while chronologers call it 1 B.C. The latter seems to be correct, and by that method the leap years before Christ fall on the years 1, 5, 9, 13, etc., while those after Christ fall upon 4, 8, 12, etc. Dates of the C. E. are greatly confused by variations of time for the beginning of the year. Dionysius, who was the author of the C. E., began the first year on the 25th of Mar., or on the day of the Annunciation to the virgin Mary, 9 months before the birth of Christ. By this calculation the C. E. began 9 months and 7 days before our year 1, which began on the 1st of January. This beginning the year on the 25th of Mar. was the practice in most Italian states as late (in Pisa) as 1745. It was adopted in some papal documents, and it was employed in France about the middle of the 11th century. In some instances the year was counted from the 25th of Mar. following our epoch, which would be 2 months and 24 days after our beginning of the era. A few writers of the 6th and 7th centuries began the year on the 1st of January. In France, the practice as late as the middle of the 16th c. was to begin the year with Easter; but in 1663 Charles IX. directed that thereafter the year should commence on the 1st of January. In Germany, about the 11th c., it was usual to begin the year with Christmas, and this practice prevailed at Milan, Rome, and other Italian cities in the 18th, 14th, and 15th centuries. In England, the practice of beginning the year at Christmas was introduced in the 7th c., and traces of it are found down to the 18th century. Gervase of Canterbury mentions that most writers of his country agreed in regarding Christmas as the first day of the year, because it formed the term at which the sun finished and recommenced his annual course. This is a remnant of the old Norse religion. In the severely cold regions of Scandinavia the return of the sun from its extreme southern declination was hailed with great rejoicing; the great yule festival was held, and offerings and thanksgiving marked the period. This was, of course, at the winter solstice, in early ages very nearly on the day of Christmas. When Ansehar and other Roman Catholic missionaries penetrated to Denmark, they engrafted upon the heathen yule the Christian Christmas, and for the return of the material sun they taught the rising of the son of God. Thus, the church Christmas may be the successor not only of the Roman saturnalia, but of the Odinic yule. The memory of the latter is still strong among the rural population of England. In England, in the 12th c., the practice prevailed of beginning the year on the Annunciation, the 25th of Mar., and that was the general practice until the reformation of the calendar, in 1751, by a parliamentary law, which directed that the year 1752 should be reckoned from the 1st of Jan., thus leaving 1751 nearly three months short. English authors, however, have endeavored to make the beginning of the historical year on the 1st of January. The liturgic year of the church of England began with the first Sunday in Advent, the Lord's day before Christmas. These variations in the commencement of the year lead to much confusion in dates. The English revolution is popularly called the revolution of 1688; but if we reckon

from the 1st of Jan., it began in 1689. In the tables of modern works on chronology, the birth of Christ is placed in the year 4 before Christ. Some recent chronologers of eminence place the Nativity nearer the Christian era. Eusebius dates the crucifixion in the year 33 A.D.; but Augustine, Origen, and others, place it in the year 29 A.D. In either case, the long-established date of the commencement of the C. E. is not altered. See CHRONOLOGY.

**CHRISTIANIA**, a province in s. Norway; about 10,000 sq. m.: population 500,000. It is a rough, mountainous region containing many lakes, and is traversed by the Glommer, the Drammen, and other rivers. The mineral products are copper, silver, and iron. Agriculture is scarcely profitable, though cattle and horses are raised in large numbers. The chief article of export is lumber.

**CHRISTIANIA**, capital of Norway, is situated in the province of Aggerhuus, in a beautiful open valley on the northern side of the Christiana fiord. Pop. '91, 151,239. C. is the seat of the Norwegian government, the superior courts, and the *storting*. Besides the suburbs of Pipervigen, Hammarsborg, Vaterland, and Groenland, the town consists of C. properly so called (which was laid out by Christian IV. in 1614, in the form of a regular parallelogram of 1000 paces in length and breadth); the Old Town or Opslo, where the bishop resides; and the citadel Aggerhuus, from which the broad straight streets of the town can be fired upon. The most important public buildings are the royal palace, the bank and exchange, the house of representatives or *storting*, the governor's palace and the cathedral. To these may be added the university, the only one in Norway, which was opened in 1813, and possesses a large staff of professors. In the year 1895 it was attended by 1142 students. This institution contains, besides various scientific collections, an extensive library, a botanical garden, and an observatory (in 59° 54' 42" n. lat., and 10° 50' e. long.). The latter was opened in 1833. C. has also some good schools and learned societies, of which the "society for northern antiquities" is famous. Among the manufactures of C. are woollen fabrics, matches, tobacco, hardware, paper, wood-pulp, etc. There are also numerous distilleries and breweries. Its exports in considerable quantities timber, matches, wood-pulp, horse-shoe nails, condensed milk, margarine, etc. In 1894, 2339 vessels of 878,706 tons entered the port (which, however, is covered with ice for four months). It has a regular steamboat communication with Gottenburg, Copenhagen, Kiel, Hull, and Leith. C., by means of its bay, is connected with Drammen, famous for its extensive trade in timber, etc. The scenery of the whole bay is unsurpassed in beauty.

**CHRISTIANITY**. It is proposed in the present article to give a very brief outline of the system of the Christian religion, and of the evidences by which its truth is established. The principal parts, both of the system and evidences of C., will be found noticed under separate heads.

C. comes to us with a claim to be received as of divine origin. It is no product of the human mind, but has for its author the Being whom it sets before us as the object of worship. It is consequently altogether exclusive; it claims to be deemed the only true religion—"the truth"—and admits of no compromise or alliance with any other system.

C. cannot be viewed as distinct from the religion of the Jews and of the patriarchs; it is the same religion accommodated to new circumstances; there has been a change of *dispensation* only. In studying either the system or the evidences of C., we are compelled continually to revert from the New Testament to the Old, and must in some measure trace the history of the true or revealed religion through the previous and preparatory dispensations.

The whole system of C. may be regarded as having its foundation in the doctrine of the existence of one God. See GOD. Next to this may be placed the doctrine of the fall (q.v.) of man. Man is represented as involved in misery by sin (q.v.)—*original* and *actual*—and every individual of the human race as incapacitated for the service and fellowship of God, obnoxious to the displeasure of God, and liable to punishment in a future and eternal state of being. See HELL; PURGATORY. And here we may regard the doctrine of the atonement (q.v.) as next claiming our attention—a doctrine taught in all the sacrifices (see SACRIFICE) of the patriarchal and Jewish dispensations, as well as by the words of inspired teachers. Man being utterly incapable of effecting his own deliverance from sin and misery, God sent his Son to save sinners, to deliver them from hell, to make them holy, and partakers of the eternal joy and glory of heaven.

By those who regard Christ as a mere creature, *atonement* or *reconciliation* with God is made to depend on the repentance of man as its immediate cause; whilst the life and death of Christ are represented as merely an example to us of obedience, virtue, and piety in the most trying circumstances; the doctrines of a propitiatory sacrifice, a substitutionary obedience, and an imputed righteousness, with all that form part of the same system, falling completely and even necessarily to the ground. These doctrines, however, are all consistently maintained in connection with the doctrine of the Trinity and the generally received doctrine as to the person of Christ. See CHRIST and TRINITY. The very incarnation (q.v.) of the Son of God is regarded as a glorious display of the divine condescension, and a wonderful exaltation of human nature; whilst a personal enjoyment of the highest dignity and bliss of which humanity is capable in the favor and fellowship of God for ever, is to be attained by faith in Jesus Christ. See FAITH and JUSTIFICATION.

The indissoluble connection between faith and salvation arises from the divine appointment, but secures a moral harmony, as it provides for bringing into operation—in accordance with the intellectual and moral nature of man—of most powerful and excellent motives for all that is morally good, the partakers of salvation being thus fitted for the fellowship of him into whose favor they are received; and as it prevents the possibility of any of them taking to themselves, or giving to others, the glory of that salvation which they really owe to Christ, and which they must therefore ascribe to Christ, as God is a God of truth, and truth must reign in the kingdom of heaven.

Salvation is ascribed by all Christians to the grace of God. The mission of Christ was an act of supreme grace; and all must be ascribed to grace for which we are indebted to Christ. The doctrine of grace, however, is part of the system of C. on which important differences subsist, especially as to the relation of the grace of God to individual men. Such are the differences concerning election (q.v.), and concerning the origin of faith, and man's ability or inability to believe of himself. But by Christians generally, the personal relation of the believer to Christ, and his faith in Christ, are ascribed to the Holy Ghost or Spirit of God, the third person of the Godhead, and so to the grace of God. See ARMINIUS, CALVINISM, and PELAGIUS.

In the view of all who hold the doctrine of the Trinity, the doctrines concerning the Spirit of God form a very important part of the Christian system. To the agency of this person of the Godhead, besides all that is ascribed to Him concerning the human nature of Christ, we are indebted for all that is spiritually good in man; He, in the economy of grace, being sent by God, on the intercession of Christ, to communicate the blessings purchased by Christ in his obedience and death. See HOLY GHOST.

Salvation begins on earth; and whenever a man believes in Christ, he is a partaker of it—in a state of salvation. It forms an essential part of the Calvinistic system, that he who is in a state of salvation always remains so, and that the salvation begun on earth is in every case made perfect in heaven. See PERSEVERANCE OF SAINTS. Thus salvation is viewed as beginning in regeneration (q.v.), and as carried on in sanctification (q.v.), and all its joys as connected with the progress of sanctification. Faith in Jesus Christ cannot be unaccompanied with repentance, and repentance is always renewed when the exercise of faith is renewed. For although all believers are *saints* or *holy*, as set apart to God, and in contrast to what they previously were, yet there is none in this life free from temptation and sin; the successful tempter of our first parents, who assailed our Savior with temptation and was defeated, being still the active enemy of man, against whom believers in Jesus Christ are called to contend, to watch, and to pray. See DEVIL. The sense of responsibility belongs to human nature; and the doctrine of a judgment (q.v.) to come may be considered as to a certain extent a doctrine of natural religion, as may also that of the immortality (q.v.) of the soul; but the clear and distinct enunciation of these doctrines belongs to the Christian revelation, to which belongs entirely the doctrine of the resurrection (q.v.) of the dead.

Of the moral part of C., which has already been referred to, it may be sufficient here to state, that it is as harmonious with the doctrinal as it is inseparable from it; that it is founded upon the attributes of God, and is perfectly illustrated in the character of Jesus Christ; and that it is divisible into two great parts—one, of the *love of God*, and the other, of the *love of man*, or of ourselves and our neighbors. See LAW, MORAL.

The *means of grace*, or of the attainment or the blessings of salvation, form an important part of the Christian system. Of these the WORD or GOD—or divine revelation contained in the Bible (q.v.)—first claims attention as the means of *conversion* to Christ, and of *edification* in Christ, the instrument by which salvation is both begun and carried on in men. The ordinances of God's worship are among the means of grace. Thus prayer (q.v.) is one of the chief means of grace. The sacraments (q.v.) are means of grace, concerning the precise use of which, and their relative importance as compared with the other means, considerable difference of opinion prevails among Christians. The same remark applies also to the combination of Christians into an organized body or community, the church (q.v.) with its own laws or system of church government (q.v.) and church discipline (q.v.).

We have endeavored to sketch the outline of the system of C., as much as possible according to the general belief of Christians, merely indicating the points on which the chief differences of opinion exist. Some of the principal controversies will be found noticed under separate heads.

The truth of C. is established by many different *evidences*, distinct and independent, but mutually corroborative. It appeals to reason, and demands to have its claims examined and admitted. Nor is there any *faith* where there is not a mental conviction arrived at by a process of sound reasoning.

The evidences of C. are very generally divided into two great classes, *internal* and *external*—the former consisting of those which are found in the nature of the Christian system itself, and in its adaptation to the nature and wants of man; the latter, of those which are derived from other sources. The boundary between the two classes, however, is by no means so distinct in reality as it appears in the definition of the terms. Of the multitude of books which have been written on the subject of the evidences of C., some are devoted mainly to one of these classes, and some to the other; whilst some are occupied with the development of particular evidences or arguments, and some with

the refutation of objections, and in particular of what may be called a preliminary objection—that a divine revelation can never be established by sufficient evidence at all. See REVELATION.

The evidence of miracles (q.v.) and the evidence of prophecy (q.v.), two of the principal branches of the external evidences of C., will be found noticed in separate articles. Another argument, which has been much elaborated—for example, in Paley's *Evidences*—is derived from the character and sufferings of the apostles and other first preachers of C.; their high moral worth, considered along with their great earnestness and devotedness; the absence of all possibility of selfish or base motives; and at the same time, their perfect opportunity of knowing the truth or the facts which they proclaimed. A subsidiary argument is found in the admission of the great facts regarding Jesus of Nazareth, by the early opponents of Christianity. A most important and valuable argument is found in the perfect coherence of all the parts of the Christian system, and in the agreement, as to the religion which they teach, of all the books of Scripture, notwithstanding the widely different dates of their composition, and their very different nature in other respects. See BIBLE. The relation of the Jewish ceremonies to the doctrines of C. supplies another argument of this kind, capable of being developed in a multitude of particulars. The minor coincidences between the different books of Scripture have been pointed out with happy effect in the *Horæ Paulinæ* of Paley, and in other works. The character of our Savior supplies an argument of great power: the impossibility of the invention of such a character, and of the history in which it is exhibited, by any effort of human genius, is also urged as corroborative; and the inconsistency of the morality displayed, with the supposition of imposture, has been dwelt upon with the same view. The excellency, both of the doctrinal and moral part of the system of C., its elevating and purifying tendency, the agreement of its doctrine with the facts of man's sinfulness and misery, and the suitable provision which it makes for his most deeply felt wants, are principal branches of the internal evidence of its truth. The effects of C., where it has prevailed, supply a confirmatory argument in its favor, which has formed the subject of works of great learning and interest. See EVIDENCES OF CHRISTIANITY.

**CHRISTIAN KNOWLEDGE, SOCIETY FOR PROMOTING**, one of the great religious associations connected with the Church of England, and the oldest of them all. It was founded in 1698, although it did not receive its present name till 1701; and had for its object: "1. To promote and encourage the erecting of charity schools in all parts of England and Wales. 2. To disperse, both at home and abroad, Bibles and tracts of religion; and, in general, to advance the honor of God, and the good of mankind, by promoting Christian knowledge, both at home and in other parts of the world, by the best methods that should offer." These objects it has never ceased to pursue, chiefly directing its efforts to the British dominions; partaking at once of the nature of an educational association, a missionary society, a Bible society, and a religious tract society; and notwithstanding the operations of other great societies in these several departments of Christian benevolence, its revenue amounts to about £100,000 a year. The Protestant missionaries who labored in the s. of India in last century, were supported chiefly by this society, which has also contributed largely of its funds for the establishment of Christian schools in that country.

**CHRISTIAN NAME.** See NAME.

**CHRISTIANSAND**, the principal t. of the province or *stift* of that name in Norway. is situated at the mouth of the Torridalselvi, in the bay of Christiansand. Pop. '91, 12,541. C. is the residence of a bishop and high-bailiff or *stift-amtmænd*, and possesses a branch of the Norwegian bank, a gymnasium, and several charitable foundations. The manufactures are leather, tobacco, cotton, etc. Ship-building forms also a considerable branch of its industry. The town, which was built in 1641 by Christian IV., has an excellent harbor, divided into two parts by the island of Oddern, upon which are situated the quarantine hospital and custom house. C. exports wood, lobsters, and salmon in large quantities. The town and harbor are protected by several fortifications. To the west of C. lies the harbor of Ny-Hollesund.

**CHRISTIANSBURG**, a town and co. seat of Montgomery co., Va.; in a magisterial district of the same name; 86 miles w. of Lynchburg; on the Norfolk and Western railroad. The district includes a part of the Blue Ridge. The town contains a female institute, tobacco factory, and weekly newspaper. Pop. '90, town and district, 5215.

**CHRISTIANSFELD**, a settlement of Moravian brothers, in the northern part of Schleswig, was founded in 1772. The houses, which are well built, and cheerful in appearance, are arranged in two parallel streets, with the church upon a green plot in the middle. Population about 2000.

**CHRISTIANS OF ST. JOHN, or NAZAREANS**, a sect in Persia, in the country around Bassorah. They seemingly deify John the Baptist and consider Jesus an impostor. They say that they dwell on the Jordan in the time of Jesus, but were driven from Palestine by the Mohammedans. Their name "Christians" is wholly a misnomer. They consider the Jehovah of the Jews a spurious divinity, and Christ a false teacher; that the world was created by seven angels of darkness who inhabit the seven planets, and there is also a kingdom of light superintended by good angels. Behind these kingdoms is a region of splendor, and there is the supreme original being, Ferha, and the

female principle, Ajar. There are conflicts between the worlds of darkness and of light, but light is to triumph. The Mosaic and Christian systems of religion came from the region of darkness; but that of John the Baptist from the region of light. Baptism is the means of introducing men to the kingdom of light. John was married, but his children sprang from the Jordan. These people practice polygamy, and forbid mourning for the dead. They have five sacred books, of which four are doctrinal, and one treats of astrology. It is supposed that, 200 years ago, they numbered about 100,000.

**CHRISTIANS OF ST. THOMAS**, the name of a branch of an old Persian church still existing on the Malabar coast, formed originally by excommunicated Nestorians. Their liturgy is in the Syriac language. They still celebrate the early agape or love-feast, use bread, salt, and oil in the communion of the supper, and anoint infants in baptism. Their priests are allowed to marry.

**CHRISTIAN SCIENCE.** See **SCIENCE, CHRISTIAN.**

**CHRISTIANSTAD**, the strongly fortified capital of a province of the same name in the s. of Sweden. It is situated on the Helge, about 9 m. from the Baltic, and 265 s.w. of Stockholm. C. is the residence of a governor, and the seat of a court of justice. It is a beautifully built town, and possesses an arsenal, a school, a magnificent church, and a senate-house. Pop. 8,308, employed chiefly in the manufacture of woollen goods, leather, gloves, etc. There is also some trade in wood, pitch, potash, etc. The town, which was founded by Christian IV., has suffered many sieges during the wars between Denmark and Sweden. The province of Christianstad has an area of 2,486 m.; pop. '06, 219,868.

**CHRISTIANSTED**, the chief t. of the Danish island of St. Croix, in the West Indies. It stands on the n.e. coast of the island, and has an excellent harbor, which is defended by a fort and a battery. Here resides the governor-general of the Danish West Indies. The number of its inhabitants is 10,000.

**CHRISTIANSUND**, a seaport on the w. coast of Norway, 85 m. w.s.w. of Trondhjem, in 63° 8' n., and 7° 40' e.; pop. '91, 10,381. The chief export is fish.

**CHRISTIAN UNION CHURCHES**, an organization projected at Columbus, Ohio, in 1865, and having, in 1887, 15,000 churches, 500 ministers, and 120,000 members, principally in the western states. Their leading doctrines, as stated in their publications, are: the oneness of the church, with Christ the only head and the Bible the only rule of faith and practice; the good works of a Christian life the only condition of fellowship; the suppression of controversy; local or congregational church government; no preaching of party politics. Baptism is a condition of membership, but in communion they are practically unrestricted. In 1887 steps were taken toward a union with the Christian connection (q.v.). A similar body in the south is called the Christian Church, and had, 1890, 143 churches, about 180 ministers, and 13,000 communicants.

**CHRISTINA**, Queen of Spain. See **MARIA CHRISTINA.**

**CHRISTINA**, Queen of Sweden, only child of the great Gustavus Adolphus, was b. Dec., 1626, and succeeded her father in 1632, when only six years old. Distinguished equally by beauty and the possession of a lively imagination, a good memory, and uncommon intelligence, she received the education rather of a man than of a woman; and to this may in part be attributed the many eccentricities of her life. During her minority, the kingdom was governed by the five highest officers of the state, the principal being chancellor Oxenstiern. In 1644, she assumed the reins of power, and, in 1650, was crowned with the title of *king*. She had previously declared her cousin, Charles Gustavus, her successor. For four years thereafter, she ruled the kingdom with vigor, and was remarkable for her patronage of learned and scientific men. In 1654, however, at the age of 28, weary of the personal restraint which royalty imposed on her, she abdicated in favor of her cousin, reserving to herself sufficient revenues, entire independence, and supreme authority over her suite and household. Leaving Sweden, she proceeded to Brussels, where she embraced the Roman Catholic religion. She afterwards went to Rome, which she entered on horseback, in the costume of an amazon, with great pomp. Confirmed by Pope Alexander VII., she adopted the surname of Alessandra. In 1656, she visited Paris; and the following year, on a second residence there, she caused her grand equerry, Monaldeschi, who had enjoyed her entire confidence, to be executed in her own household for treason. In 1658, she returned to Rome, and, in 1660, the death of the king, her cousin, caused her to hasten to Sweden; but, failing in her attempt to be reinstated on the throne, she again left the country. In 1666, she aspired to the crown of Poland, but was unnoticed by the Poles. The remainder of her life was spent in Rome in artistic and scientific pursuits. Besides founding an academy, she collected valuable MSS., medals, and paintings, and died April 19, 1689. Much of her conduct favors the idea that at times she was scarcely sane.

**CHRISTINOS**, a political party in Spain during the regency of Queen Christina, who were opposed to the Carlists.

**CHRISTISON**, Sir ROBERT, D.C.L., an eminent physician, son of Alexander Christison, professor of humanity in the university of Edinburgh, was b. at Edinburgh, July

18, 1797; was educated at the high school of his native place, and, in 1811, became a student at the university there. After graduating in 1819, he proceeded to London and Paris; and, in the French capital, studied toxicology under the celebrated Orfila, a department of medical science in which in Britain his name has become eminent. Commencing the practice of medicine at Edinburgh, he was, in 1822, appointed professor of medical jurisprudence in the university of that city, and, in 1832, was promoted to the chair of *materia medica*. Besides contributing papers on various subjects to medical journals, C. is author of a *Treatise on Poisons*, published in 1829, recognized as a standard work on the subject; *Biographical Sketch of Edward Turner, M.D.* 1837, being an address delivered before the Harveian society of Edinburgh; a treatise *On Granular Degeneration of the Kidneys*, 1839; and *The Dispensatory, a Commentary on the Pharmacopœia of Great Britain*, 1842. Twice president of the royal college of physicians, Edinburgh, and ordinary physician to the queen in Scotland, in 1871 he was created a baronet. In 1877, sir Robert retired from all work. He d. 1882.

**CHRISTLIEB, THEODOR**, D.D., b. 1833; a native of Wurtemberg; educated at Tübingen, a teacher in France, a preacher in London, and an author of lectures on *Modern Doubt and Christian Belief*. He returned to Germany in 1865, and was made professor of theology at Bonn. In 1873, he was a delegate to the evangelical alliance, in New York. At its sessions his addresses excited great interest. He d. in 1889.

**CHRISTMAS**, the day on which the nativity of the Savior is observed. The institution of this festival is attributed by the spurious Decretals to Telesphorus, who flourished in the reign of Antoninus Pius (138-61 A.D.), but the first certain traces of it are found about the time of the emperor Commodus (180-92 A.D.). In the reign of Diocletian (284-305 A.D.), while that ruler was keeping court at Nicomedia, he learned that a multitude of Christians were assembled in the city to celebrate the birthday of Jesus, and having ordered the church doors to be closed, he set fire to the building, and all the worshippers perished in the flames. It does not appear, however, that there was any uniformity in the period of observing the nativity among the early churches; some held the festival in the month of May or April, others in Jan. It is, nevertheless, almost certain that the 25th of Dec. *cannot* be the nativity of the Savior, for it is then the height of the rainy season in Judea, and shepherds could hardly be watching their flocks by night in the plains.

C. not only became the parent of many later festivals, such as those of the Virgin, but especially from the 5th to the 8th c., gathered round it, as it were, several other festivals, partly old and partly new, so that what may be termed a *Christmas cycle* sprang up, which surpassed all other groups of Christian holidays in the manifold richness of its festal usages, and furthered, more than any other, the completion of the orderly and systematic distribution of church festivals over the whole year. Not casually or arbitrarily was the festival of the nativity celebrated on the 25th of Dec. Among the causes that co-operated in fixing this period as the proper one, perhaps the most powerful was, that almost all the heathen nations regarded the winter-solstice as a most important point of the year, as the beginning of the renewed life and activity of the powers of nature, and of the gods, who were originally merely the symbolical personifications of these. In more northerly countries, this fact must have made itself peculiarly palpable—hence the Celts and Germans, from the oldest times, celebrated the season with the greatest festivities. At the winter-solstice, the Germans held their great yule-feast (see **YULE**), in commemoration of the return of the fiery sun-wheel; and believed that, during the twelve nights reaching from the 25th Dec. to the 6th Jan., they could trace the personal movements and interferences on earth of their great deities, Odin, Berchta, etc. Many of the beliefs and usages of the old Germans, and also of the Romans, relating to this matter, passed over from heathenism to Christianity, and have partly survived to the present day. But the church also sought to combat and banish—and it was to a large extent successful—the deep-rooted heathen feeling, by adding—for the purification of the heathen customs and feasts which it retained—its grandly devised liturgy, besides dramatic representations of the birth of Christ and the first events of his life. Hence sprang the so-called “manger-songs,” and a multitude of C. carols, as well as C. dramas, which, at certain times and places, degenerated into farces or fools’ feasts (q. v.). Hence also originated, at a later period, the Christ-trees, or Christmas-trees, adorned with lights and gifts, the custom of reciprocal presents, and of special C. meats and dishes, such as C. rolls, cakes, currant-loaves, dumplings, etc. Thus, C. became a universal social festival for young and old, high and low, as no other Christian festival could have become.

In the Roman Catholic church, three masses are performed at C.—one at midnight, one at daybreak, and one in the morning. The day is also celebrated by the Anglo-Catholic church—special psalms are sung, a special preface is made in the communion service, and the Athanasian creed is said or sung. The Lutheran church, on the continent, likewise observes C.; but the Presbyterian churches in Scotland, and the whole of the English dissenters, reject it, in its religious aspect, as a “human invention,” and as “savoring of papistical will-worship,” although, in England, dissenters as well as churchmen keep it as a social holiday, on which there is a complete cessation from all business. But within the last hundred years, the festivities once appropriate to C. have



much fallen off. These at one time lasted with more or less brilliancy till Candlemas, and with great spirit till twelfth-day.

**CHRISTMAS-BOX**, a small money-gift to persons in an inferior condition on the day after Christmas, which is hence popularly called *boxing-day*. The term, and also the custom, are essentially English, though the making of presents at this season and at the new year is of great antiquity. A number of interesting particulars concerning the Christmas-box will be found in Brand's *Popular Antiquities*. Here, we need refer only to the usage in its later aspect. Within the memory of middle-aged persons, the practice of giving Christmas-boxes, or petty presents, to apprentices, domestic servants, and tradesmen, had become a serious social nuisance, more particularly in London, where every old custom seems to linger, and is most difficult to be got rid of. Householders felt under an obligation to give money to the apprentices in the shops where they dealt, also to various inferior parish officers, including scavengers and lamplighters: while shopkeepers, on the other hand, were equally impelled to make presents to the male and female servants of their customers. The grievance finally became so intolerable that the public authorities were forced to remonstrate.

**CHRISTMAS CARDS**, as now sold and distributed in millions during the festive season, in their various forms, are familiar to every one. The invention has been ascribed by some to the late Sir Henry Cole; by others, the credit of designing the first Christmas card in 1846, is given to J. C. Horsley, R.A. Immense progress has been made in beauty and artistic effect since the time when the popular emblems were more or less confined to Old Father Christmas, images of flowers, the robin-redbreast, or the dove. The prize competitions for designs have also done not a little in stimulating the art. Their production is begun often more than a year in advance; and the system of sending Christmas cards, as also New Years', Easter, and birthday cards, has created a new trade, and a new field for artists, engravers, lithographers, and printers. The quantity of Christmas cards passing through the post-office leads to congestion for a few days in ordinary deliveries. The greatest variety of design is seen in the cards of Prang, Boston, who first introduced chromo-lithography. Of late years, Easter cards are as much sent as those appropriate to Christmas.

**CHRISTMAS CAROLS**. The word carol (Ital. *carola*, and Fr. *carole*, a round dance—probably from Lat. *corolla*; Welch, *coroli*, to reel, to dance; the name is thence applied to the music or song accompanying such a dance: *carillon* is probably allied) signifies a song of joy. The practice of singing carols, or, at all events, sacred music, in celebration of the nativity of Christ as early as the 2d c., is considered as proved by the circumstance that a large sarcophagus belonging to that period has sculptured upon it a representation of a Christian family joining in choral praise for this purpose. A century or two after this, however, the C. C. seem to have sadly degenerated, and become, in fact, so indecent, that the clergy found it necessary to forbid them. Under the Anglo-Saxon kings, merriment and piety were pleasantly combined in English life, a peculiarity that affected the C. C. of that period not a little; but by the 13th c. the jocosity had unhappily lapsed into what would now be considered profanity. The oldest printed collection of English C. C. bears the date of 1521. The majority of these, though written by men of learning—priests and teachers—exhibit a lamentable ignorance of the character of the two most prominent persons in the carols—Mary and Jesus. In 1525 was kept the "still Christmas," on account of the illness of King Henry; but with this exception, the sacred season appears to have been regularly celebrated with joyous music and songs during the Tudor period. In 1562, C. C. of a more solemn nature were introduced. By the Puritan parliament, Christmas was abolished altogether, and holly and ivy were made seditious badges; and in 1630 the Psalms, arranged as carols, were advertised. After the restoration, the C. C. again exhibited a hearty, cheerful, and even a jovial character. Those with which the dawn of Christmas is now announced in England are generally religious, though not universally so. In France, the carols at this season used to be much less sacred than gay. Often, indeed, they were grossly Bacchanalian.

**CHRISTMAS ISLAND**, an island in the Pacific ocean (latitude 1° 57' 16.8" N.; longitude, 157° 28' 49.5" W.), is a large, low atoll, with a good anchorage, and is the headquarters of an American guano company.

**CHRISTOL'OGY** is the doctrine of the person of Christ. The word itself is to be found, once or so, in the divines of the 17th c. (See Dean Trench on the *Study of Words*), but the department of scientific theology which it now represents is almost entirely the growth of modern, and particularly of German inquiry. As yet, it can hardly be said that the word C. is accredited in Great Britain, but the same differences of opinion which led to its adoption in Germany, are beginning to manifest themselves here also. There are only three methods of apprehending the doctrine of the person of Christ. First, there is the *rationalistic* method. This consists in representing the development of the Messianic idea in Jewish history as purely natural, and conditioned by purely human and historical influences—in short, as a subjective or self-originated notion, to which there was no correspondent divine reality. Second, there is, what, for want of a better word, we may call the *spiritualistic* method (that of theologians like Neander, Rothe, etc.). This consists in representing the development of the Messianic idea in Jewish

history as both natural and supernatural; that is to say, it asserts the existence of a divine objective reality ("the eternal Son of God") as the basis of the subjective idea in the minds of the Jews, and regards the growth of that idea, and the influence of historical circumstances, as the result of a supernatural providence, which culminated in the revelation "of the mystery of godliness, God manifest in the flesh." Third, there is the *dogmatic* method, which is the one accepted by the common order of theologians. This consists in representing the doctrine of the person of Christ as *symbolically* known to the spiritually-minded among God's people from the earliest ages. "Abraham saw his (Christ's) day afar off." This is interpreted to signify that, by the grace of prophetic illumination, the righteous men of old were enabled to foresee in a mysterious and inexplicable manner the atonement of Christ, as it happened in history. Admitting with the spiritualistic theologians, that the Messianic idea among the Jews underwent, in some sense, a historical development, the dogmatic Christologists differ, in general, from the former by attributing to the higher minds such a knowledge of the *work* of Christ, as logically involves a knowledge of his person and character. The entire absence, however, of any *personal* traits of Christ in the Old Testament, such as might be expected of those who had seen him even with the eye of faith, has induced many orthodox theologians to shrink from making any statement in regard to what may have been the doctrine of the person of Christ among the ancient Jews.

**CHRISTOPHE, HENRI**, king of Hayti, b. Oct. 6, 1767, was at one period a slave and tavern-cook in Cape Town, St. Domingo, and afterwards overseer of a plantation. In 1790, he joined the black insurgents against the French, and, from his gigantic stature, energy, and courage, soon became a leader among them. By Toussaint Louverture, he was appointed brig.-gen., and employed to suppress an insurrection headed by Moyse or Moses, his nephew. C. captured the latter, and on his execution, succeeded him as governor of the northern province of French St. Domingo. In 1802, he gallantly defended Cape Town when Gen. Leclerc arrived there with a French army destined for the reduction of the blacks, and effected his retreat with 8,000 men, after having burned the greater part of the town. The perfidious seizure of Toussaint he amply revenged, and during the short-lived government of Dessalines, who was slain by a military conspiracy in Oct., 1806, C. was gen.-in-chief of the Haytian army. In Feb., 1807, he was appointed president of Hayti for life. A republic being, about the same time, organized at Port-au-Prince, with Petion at its head, civil war commenced between them. On Mar. 28, 1811, C. was proclaimed *king* of Hayti, by the name of Henri I., and solemnly crowned, June 2, 1812. In 1814, he and Petion suspended hostilities, and by his power and skill, C. was enabled to counteract the attempts made by France to regain its authority in the island. His avarice and cruelty led to an insurrection, which was aided by Gen. Boyer, who had succeeded Petion in 1818; and the rebellion having spread to Cape Town, C.'s deposition was proclaimed, at the head of the troops, by the duke of Marmalade, one of the first dignitaries in the kingdom. Deserted by his body-guard and all his nobles, he shot himself, Oct. 8, 1820. He left a code of laws, which he called the "Code Henri," in imitation of the Code Napoleon.

**CHRISTOPHER, HERR.** See ACTÆA.

**CHRISTOPHER NORTH.** See WILSON, JOHN.

**CHRISTOPHER, SAINT**, a saint of the Roman Catholic and Greek churches. He is supposed to have suffered martyrdom about the middle of the 3d century. According to vulgar legend, C., whose name was originally *Adokimos* (the unrighteous), was a native of Palestine, Syria, or Lycia, and a person of prodigious bulk and strength. His height was 12 feet. So proud was he of his gigantic frame, that he would serve only the mightiest princes. Having attached himself to one, who went for the greatest of his day, C. stayed with him for a short time, but soon discovered that his master was terribly afraid of the devil, in consequence of which, C., with fearless consistency, passed into the service of the latter. One day, however, when the devil and he chanced to be walking through a wood, they came across an image of Christ. His new master exhibited such perturbation and alarm at the sight, that C. entirely lost confidence in him, and resolved to find out the Savior, and follow him. For a long while he searched in vain, but finally he fell in with a hermit, who showed him Christ, and baptized him. C. despised the customary penances, and in consequence, it was imposed on him to carry Christian pilgrims on his shoulders over a stream which had no bridge. One day, a little child came to the stream; C. took it on his shoulders, but soon began to sink under the weight of his burden. The child was Christ himself, and to prove it, he commanded C. to stick his staff into the ground. He did so, and next morning it had blossomed into a palm-tree bearing fruit. This miracle converted thousands to Christianity. C.'s success excited the enmity of Dagnus, the prefect of that region, who put him in prison, scourged him with red-hot rods, put a burning helmet on his head, and clapped him on a burning stool. C. still remained uninjured. Multitudes of poisoned arrows were now discharged against him, but they rebounded from his charmed body, and one even wounded the prefect himself in the eye. C. pitied his tormentor, and freely offered his head to the executioner, that the prefect might be healed by the blood which should flow from it. This was done, and, as a matter of course, Dagnus and his family became Christians. The Greek church celebrates his festival on the 9th of May; the Roman Catholics, on the 25th of July.

St. C. was greatly invoked in times of pestilence, or when people were digging for treasures, to frighten away the spirits who watched over them. The formula used was called a *Christopher's prayer*. He was also the patron of an order of moderation, founded in Austria in 1517, for the purpose of checking excessive drinking and swearing, and which was called the order of St. Christopher.

**CHRISTOPHER'S, Str.**, or, popularly, *St. Kitts*, an island near the n.e. bend of the great arch of the Antilles, 46 m. to the w. of Antigua, and 2 m. to the n. of Nevis. With a very unequal breadth, it is 20 m. long from s.e. to n.w., containing about 44,000 acres, and (1881) 29,137 inhabitants. It belongs to Great Britain, and has a legislature of its own, with an executive immediately subordinate to the governor-in-chief of the Leeward group, residing in Antigua. In 1880, the revenue of the colony was £32,000, having been only £3,638 in 1834; so that, under the system of free labor, it had increased nearly nine-fold in 46 years. During the same interval, the imports had risen in value from £63,018 to £168,000, and the exports from £105,267 to £186,000. The staple exports are sugar, rum, and molasses. The debt of the island in the year 1880 amounted to £3700. Education is in a promising condition. At the present time (1891), the establishment of grammar schools is contemplated. In 1886 the population was 45,000.

The chief towns, both of them seaports with open roadsteads, are Basse-Terre, derended by Fort Smith, and Sandy Point, protected by Fort Charles and Brimstone Hill. Of Fort Smith, the exact lat. and long. are 17° 17' 7" n., and 62° 48' west. The mean annual temperature of these places, and of the coast generally, is about 80° F.; but the mornings and evenings, even of the hottest days, are agreeably cool. The length of the island is traversed by a well-wooded ridge of volcanic origin, which has in its center a crater; and towards the w. extremity of the range, rises the nearly perpendicular crag of Mt. Misery, with an altitude of 3,711 ft. above the level of the sea. Over the adjacent slopes, which gradually descend to the water's edge, this central range sends down several streams—almost every plantation, in fact, receiving its rivulet in the rainy season. The springs, though numerous, are yet mostly brackish; and indeed the southern extremity of the island presents a number of salt ponds.

St. Kitts, appropriately named by the natives "the fertile isle," was discovered by Columbus in 1493, and colonized by the English in 1623, who were almost immediately joined by some French adventurers. After treacherously exterminating the Caribs, the French and English, often quarrelling, occupied the island, till, in 1718, the treaty of Utrecht gave the whole to England. In 1782, during the war of American independence, St. Kitts was captured by the French, but restored. On July 31, 1865, a terrific fire took place at Basse-Terre.

**CHRISTOPULUS, ATHANASIOS**, 1772-1847; a Greek poet, the son of a Wallachian priest. He studied at Buda and Padua, and became teacher in the family of the Wallachian prince Mourousi, and, after the fall of that prince, he assisted the hospodar Caradja in drawing up a code of laws for the nation. He wrote love ditties and drinking songs, which are very popular among the Greeks. He is also the author of a tragedy, and some philological works.

**CHRIST'S COLLEGE**, Cambridge, was originally founded by Henry VI., under the name of God's house, and was intended by him to consist of a master, 12 fellows, and 47 scholars. In 1505, however, there were only three fellows besides the master, when lady Margaret, countess of Richmond and Derby, mother of Henry VII., "counting herself, as of the Lancaster line, heir to all Henry VI.'s godly intentions," made up the full number, and endowed the college liberally, changing its name to Christ's college. Edward VI. added one fellow, and three scholars; and sir John Finch and sir Thomas Baines increased the number of fellows to fifteen. C. C. possesses many rich benefactions for the encouragement of students, amongst which are specially to be noticed four studentships founded by Christopher Tancred, worth £107 per annum, and tenable for three years after taking the degree of B.A. A student is elected annually before coming into residence. Amongst the illustrious men connected with this college may be noted Bishop Latimer, John Milton, and Ralph Cudworth, author of the *Intellectual System*.

**CHRIST'S HOSPITAL**, Newgate street, London, was founded on the site of the Greyfriars' monastery, by Edward VI., June 28, 1553, as a hospital for orphans and foundlings. It is usually called the "blue-coat school," on account of the dress worn by the boys. This consists of a blue woollen gown or coat with a narrow red leather girdle round the waist, yellow breeches, and yellow stockings, a clergyman's bands at the neck, and a small blue worsted cap, but this last they seldom wear, and are generally seen going about bareheaded—such has been the costume of the boys since the foundation of the school in the reign of Edward VI.; the persistency in it through successive generations, affording a curious instance of the unchangeableness in some of the English usages. No boy is admitted before seven years of age, or after 10, and none can remain after 15, with the exception of "king's boys" (i.e., those who attend the mathematical school founded by Charles II. in 1672) and "Grecians" (i.e., the highest class of scholars in the hospital), of whom eight are sent on various scholarships to the universities of Oxford and Cambridge. Altogether, about 800 boys can be admitted. The

right of presentation is vested in the managing governors. These are the lord mayor of London, the aldermen, and 12 common councillors. Besides these, all noblemen and gentlemen who benefit the hospital to the extent of £400 are governors. The managing governors are the patrons of several churches, chiefly in Surrey and Essex. The most of the income of C. H., which amounts to about £70,000, is derived from legacies subsequent to its original charter. King Charles' foundation enriched it by £7,000, with an additional annuity of £370 10s., for the purpose of educating yearly 10 boys for the sea-service. Most of the building perished in the great fire of 1666; but, through the generosity of the corporation of London, and the liberal help of wealthy Englishmen, it was soon rebuilt, under the superintendence of sir Christopher Wren. In the course of time, the new hospital fell into decay, and in 1825, a third structure was erected by Mr. Shaw. The great hall of the hospital is a magnificent room, second only to that of Westminster. C. H. is essentially a classical institution, Latin and Greek being the basis of education; but, to satisfy the wants arising from the changed condition of society, the modern languages, drawing, etc., are also taught.

**CHRIST'S THORN.** See JUBBE and PALIURUS.

**CHRISTUS**, oratorio for soli, chorus, organ, and full orchestra, by Franz Liszt, text in Latin; first performed in Rome, July 6, 1867, and first given in its entire form in New York, March 8, 1887. The subject is the life of Christ: the first part a Christmas oratorio; the second, after the Epiphany. The work contains an Easter hymn, *O Filii et Filia*, of much beauty, written in one of the ancient modes.

**CHROMATIC**, in music, is a term applied to a series of notes at the distance of a semitone from each other. Such a series is produced by dividing the whole tones of the diatonic scale into semitones, so that with the two diatonic semitones, already in the natural scale, the octave is divided into 12 semitones. The word C. is from the Greek, and means colored. Ascending C. passages are formed by the whole tones of the diatonic scale being raised or elevated by a sharp or a natural, according to key, and descending passages by their being lowered by a flat or a natural, thus:



It is usual to speak of the C. scale, but that is wrong, as it is only a melodic progression of semitones, certain notes of which belong to, and form the diatonic scale, showing that the foundation of the system of music does not rest on a C. basis, but on the natural diatonic progression of sounds.

**CHROMATIC**, in optics. See ACHROMATISM.

**CHROMATICS** is that part of the science of optics (q.v.) which explains the properties of the colors of light and of natural bodies. Before 1666, when sir Isaac Newton began to investigate this subject, the notions which prevailed respecting the nature of colors were purely fanciful. Till Descartes' time, indeed, it seems not to have been conceived that color had anything to do with light. As examples of the notions prevalent at very early times, we may cite those propounded by Pythagoras and Zeno. According to the former, color was the superficies of bodies; according to the latter, it was "the first configuration of matter"—whatever that may be. It is now settled that white light is not homogeneous, but consists of rays of different colors, endued with different degrees of refrangibility, and that the different colors of bodies arise from their reflecting this or that kind of rays most copiously. According to this, a body that appears red reflects red rays in greater abundance than the others; and one that appears black reflects none of the rays—in other words, absorbs all the light that falls upon it. The analysis of a beam of the sun's light by a prism was the experiment by which Newton demonstrated his great optical discovery of the unequal refrangibility of the variously colored rays, and laid the foundations for the above theory of color. The reader will find an account of this experiment, and of the most interesting phenomena presented by the spectrum, under the article SPECTRUM. Newton concluded from his experiments that white light is composed of seven colors, which he called the primary colors—viz., red, orange, yellow, green, blue, indigo, and violet, and that all other shades of color arise from the admixture of these in different proportions. Sir David Brewster, on the other hand, conceives that he has established that the primary colors are only three in number—red, yellow, and blue. This result he obtained by examining the rays of the spectrum through different absorbing media—a mode of experiment now admitted to be fallacious in principle. Professor Maxwell, by direct examination of the rays, concludes that the three primary colors are red, green, and blue. Recently, a theory has been propounded, that all the colors are the results of the admixture of white light and of shade, or darkness; but as yet no attempt has been made to support this theory by direct experiment on the sun's rays. It is rested on results obtained by combining by motion certain pro-

portions of white and black pigments on a revolving card. See the articles LIGHT, DISPERSION, and NEWTON'S RINGS.

**CHROMATROPE** (Gk. *chrōma*, color, *trope*, a turning), is an optical toy, a modified form of the phenakistoscope (q.v.), consisting of a revolving disc, on which are painted circular arcs of various colors. These arcs are arranged in pairs, passing through the centre of motion, no two sets of pairs intersecting in exactly the same way. The result is, that when the chromatrope is made to revolve rapidly, streams of beautiful, brilliant colors seem to flow either to or from the centre of motion, according as the disc is made to rotate in one direction or the opposite. The same principle is utilized in the *chromatrops slide*, employed in magic lantern exhibitions. In this, two circular discs of glass are placed face to face, each with a design radiating from the centre, and painted with brilliant transparent colors. By a small pinion gearing in toothed wheels or endless bands, the discs are made to move in opposite directions in their own plane. The effect produced is a singularly beautiful change of design and color.

**CHROMATYPE** (Gr. *chrome*, color; *typos*, impression), a photographic process, thus described by its discoverer, Mr. R. Hunt. One dram of sulphate of copper is dissolved in one ounce of distilled water, to which is added half an ounce of a saturated solution of bichromate of potash; this solution is applied to the surface of the paper, and when dry, it is fit for use, and may be kept for any length of time without spoiling. When exposed to sunshine, the first change is to a dull brown, and if checked in this stage of the process, we get a negative picture; but if the action of light is continued, the browning gives way, and a positive yellow picture on a white ground is obtained. In either case, if the paper, when removed from sunshine, is washed over with a solution of nitrate of silver, a very beautiful positive picture results.

**CHROMIC IRON**, or **CHROMITE**,  $\text{FeO} \cdot \text{Cr}_2\text{O}_3$ , ore of chromium, found in Maryland, Pennsylvania, the Shetland islands, Scotland, France, and other places. It usually occurs in mass, but is sometimes crystallized in octahedrons. Oxides of chromium and iron are its ingredients.

**CHROMIUM** (*chrome*, color) is a metal, so called from the many-colored compounds it produces. It was discovered by Vauquelin in 1797. C. occurs naturally as the chromate of lead,  $\text{PbCrO}_4$ , and the chromite of iron, *chrome iron ore*,  $\text{FeO} \cdot \text{Cr}_2\text{O}_3$ , at Unst and Fetlar in the Shetlands, and Portsoy in Banffshire, etc. The metal has been obtained in powder and in scales, but as a metal it possesses no interest. The principal compound of C. is the bichromate of potash, obtained by heating chrome iron ore in powder with one fourth of its weight of niter, and then digesting in water, which dissolves out the chromate of potash,  $\text{K}_2\text{CrO}_4$ , a yellow salt, and when this is acted upon by sulphuric acid, it is converted into bichromate of potash,  $\text{K}_2\text{Cr}_2\text{O}_7$ , readily crystallizes in orange-red crystals, which is soluble in water, and is largely used by the dyer and calico-printer. If this salt be added to a solution of lead, an abundant yellow precipitate occurs of chromate of lead,  $\text{PbCrO}_4$ , or *chrome yellow*, which is used largely by the painter as a yellow pigment. A sesquioxide of C. ( $\text{Cr}_2\text{O}_3$ ), *chrome green*, possessing a bright green color, which renders it useful in enamel-painting, and being innocuous, it is now introduced into paper hangings instead of the highly dangerous arsenical green pigment. The bichromate of potash is employed in conjunction with sulphuric acid as an agent in bleaching palm-oil and other oils and fats, and also in galvanic batteries.

**CHROMO-LITHOGRAPH.** See LITHOGRAPHY.

**CHROMOSPHERE.** See SUN.

**CHRONICLE** (from *chronos*, time), denotes a history in which events are treated in the order of time. A C. is understood to differ from annals in being more connected and full, the latter merely recording individual occurrences under the successive years or other dates. Most of the older histories were called chronicles, such as the *Saxon Chronicle*, *Holinshed's Chronicle*. The term is seldom applied to a modern book, but frequently to a newspaper—as, for instance, *The Morning Chronicle*.

**CHRONICLES**, the name of two of the books of the Old Testament, as found in the common English Bible. In the Hebrew canon the C. form but one book, which is entitled *Events of the Times*—and this appears to have been a designation commonly applied to special histories—in more definite shape, *Events of the Times of King David*, or the like. The Greek translators divided the long Hebrew book into two, and adopted the title *Things Omitted*, that is, not recorded in the other historical books. Jerome suggested the title *Chronicon*, whence comes the English name. The book of C. begins with Adam and ends abruptly in the middle of Cyrus's decree of restoration. The continuation of the narrative is found in the book of Ezra, which fills up the fragment of the decree of the Persian king. Of the authorship of C. nothing is known except what can be determined by internal evidence. The language implies that the book is one of the latest of the Old Testament. In the Hebrew Bible it is placed last. As to the time of the writing of C., it is argued that the chronicler wrote after the fall of the Persian monarchy. What seems to be certain and important for a right estimate of the book is that the author lived a considerable time after Ezra, and stood entirely under the influence of the religious institutions of the new theocracy. This point of view determined the nature of his interest in the early history of his people. The true

importance of Hebrew history had always centered in the fact that this petty nation was the people of Jehovah, the spiritual God. The tragic interest which distinguishes the annals of Israel from the forgotten history of Moab or Damascus lies wholly in that long contest which finally vindicated the reality of spiritual things and the supremacy of Jehovah's purpose, in the political ruin of the nation which was the faithless depositary of these sacred truths. After the captivity, it was impossible to write the history of Israel's fortunes otherwise than in a spirit of religious pragmatism. But within the limits of the religious conception of the plan and purpose of the Hebrew history more than one point of view might be taken. The book of Kings looks upon history in the spirit of the prophets. But before the chronicler wrote, the last spark of prophecy had become extinct. The Jerusalem of Ezra was organized no longer as a nation, but as a municipality and a church. The center of religious life was no longer the prophetic word, but the ordinances of the Pentateuch and the liturgical service of the sanctuary. The religious vocation of Israel was no longer national, but ecclesiastical and municipal; and the historical continuity of the nation was vividly realized only within the walls of Jerusalem and the courts of the temple, in the solemn assembly and stately ceremonial of a feast day. These influences naturally operated most strongly on those who were officially attached to the sanctuary. To a Levite, even more than to other Jews, the history of Israel meant above all things the history of Jerusalem, of the temple, and of the temple ordinances. The author of C. betrays in every page his essentially Levitical habit of mind. To such a mind, in the fallen condition of the Jews as a political nation, there seemed to be room for a new history, which should confine itself to matters still interesting to the theocracy of Zion, keeping Jerusalem and the temple in the foreground, and developing the divine significance of the history in its causes and results, not so much with reference to the prophetic word as to the fixed legislation of the Pentateuch, so that the whole narrative might be made to teach that the glory of Israel lies in the observance of the divine law and ritual. For the sake of systematic completeness, the author of the C. begins with Adam; but he had nothing to add to the Pentateuch, and the period from Moses to David contained little that served his purpose. He therefore contracted the early history into a series of genealogies, which were by no means the least interesting part of his work at a time when every Israelite was concerned to prove the purity of his Hebrew descent. From the death of Saul the history becomes fuller, and runs parallel with the books of Samuel and Kings. The limitations of the author's interest in past times appear in the omission, among other particulars, of David's reign in Hebron, of the disorders in his family and the revolt of Absalom, of the circumstances of Solomon's accession, and of many details as to the wisdom and splendor of that sovereign, as well as of his fall into idolatry. In the latter history the ten tribes are quite neglected, and political affairs in Judah receive attention, not in proportion to their intrinsic importance, but according as they serve to exemplify God's help to the obedient and his chastisement of the rebellious. That the author is always unwilling to speak of the misfortunes of good rulers, is not to be ascribed to a desire to suppress the truth, but shows that the book was throughout composed not in purely historical interest, but with a view to inculcate a practical lesson. The more important additions which the chronicler makes to the old narrative consist partly of full details of points connected with the history of the sanctuary and the great feasts, or the archaeology of the Levitical ministry, and partly of narratives of victories and defeats, of sins and punishments, of obedience and its reward, which could be made to point a plain religious lesson in favor of faithful observance of the law. The minor variations of C. from the books of Samuel and Kings are analogous to the larger additions and omissions, so that the whole work has a consistent and well-marked character, presenting the history in quite a different perspective from that of the old narrative. An immense amount of criticism has been expended upon C.; but after all it is safe to conclude, with Ewald and other careful critics, that there is no foundation for the charge that the chronicler invented history in the interest of his practical purpose of exhortation and encouragement. But it is not to be doubted that in shaping his narrative he allowed himself the same freedom taken by other ancient historians, and even by copy-

**CHRONOGRAM**, or **CHRONOGRAPH** (Gr. *chronos*, time, and *gramma*, a letter, or *grapho*, I write), a whimsical device of the later Romans, resuscitated during the *renaissance* period, by which a date is given by selecting certain letters amongst those which form an inscription, and printing them larger than the others. The principle will be understood from the following C., made from the name of George Villiers, first duke of Buckingham.

GEORGE IVS. DVX. BVCKINGAMLÆ.

The date MDCXVVV VIII (1628) is that of the year in which the duke was murdered by Felton, at Portsmouth. See Hilton, *Chronograms* (1883).

**CHRONOGRAPH**. Different forms of time-measures, or time-recorders, under this designation, have been invented within a recent period.

*Benson's* chronograph is intended to measure intervals of time down to tenths of a

second, for use at horse-races and other occasions where a seconds watch is not exactly suited. It has an ordinary quick train-lever movement, carrying hands which move over a dial. One of these is a seconds hand, very peculiarly made. The seconds hand is double, consisting of two distinct hands, one superposed on the other. The outer end of the lowermost hand has a small cup with a minute hole at the bottom; while the corresponding end of the uppermost hand is bent over so as exactly to reach this puncture. The little cup is filled with ink, having a consistency between that of writing-fluid and printers' ink. Suppose that a horse-race is about to take place. The observer keeps a steady look-out for the fall of the starter's flag, or whatever the signal may be: he gives a pull to a cord or string connected with the mechanism peculiar to the instrument; by this movement, the outer and bent end of the upper seconds hand dips down through the ink-cup in the lower hand, and through the puncture to the dial. A small black spot or mark is thus made upon the dial-plate; and this is repeated as each horse passes the winning-post. If the eye and hand of the operator are quick and accurate, there is a reliable record thus presented by the instrument of the duration of the race, sometimes as close as one tenth of a second. The instrument is now adopted at the principal races as a suitable one for the purpose; thus it is used for races such as the Derby, the Oaks, the Goodwood, the St. Leger, etc. It is also available for many other purposes.

*Strange's* chronograph is designed for a more scientific purpose, and constructed with more careful details. The object is to measure extremely short intervals of time, for the determination of longitudes in great trigonometrical surveys. The observer, when a particular star traverses the field of his telescope, touches a small ivory key; and on the instant, a dot or mark appears on a sheet of paper coiled round a barrel. The instrument being connected with an astronomical clock, there is a dot made for every beat of the pendulum; and as these dots are a considerable space apart (considerable, that is, for the refined instruments of the present day), it is possible to determine so wonderfully minute an interval as one hundredth of a second.

Other forms of chronograph have been adopted by astronomers. One was suggested by Prof. C. A. Young in 1866 to assume the functions of a *recording* chronograph, by marking the instant of observation in hours, minutes, seconds, and hundredths of a second, in *printed* characters, and in a form suitable for preservation and reduction.

Chronographs connected with electric and magnetic apparatus are used for determining the velocity of projectiles. Many forms have been devised by Noble, Bashforth, Navez, Le Boulengé, and other inventors. The most general arrangement consists in causing the bullet to pass through a series of screens; the rupture of each screen breaks for a moment the continuity of an electric current, sets in action an electro-magnetic apparatus, and makes a permanent mark or record.

**CHRONOL'OGY** is the science of the divisions of time. It has two main branches—mathematical C., and historical chronology. Mathematical C. is engaged with such of the units for the measurement of time as begin and end with the period of complete evolution of recurring celestial phenomena. See articles *CALENDAR*, *YEAR*, *MONTH*, *DAY*, and *CYCLE*, where the chief points in mathematical C. are explained. Historical C. uses these units among others to measure the distance in point of time between events, and to fix their *dates*. As in geography and navigation, longitude is measured from some arbitrary line, such as the meridian through Greenwich, so in historical C., *dates* are fixed by giving their distance from some arbitrary point of time, usually chosen because of some remarkable occurrence which signalized it. Such a fixed point, or *epoch*, forms the beginning of an *era*. It is thus that *dates* have been aptly said to be to events in history what the latitude and longitude of places are to the places in geography and navigation. The mathematical, or, to speak more properly, the astronomical units of time above referred to have not been, as has been already hinted, the only units used in historical chronology. In early times, the more accurate methods of mathematics were unknown, and such vague periods as "a generation," or the lifetime of leading persons in a nation, such as the priestesses of Juno, or of the kings, were assumed as units in historical chronology. The great variety of eras, too, in ancient times confuses the student of chronology. Thus the era of the Greeks began with the year of the first olympiad, or that in which Corcebus was victor; being the first celebration of the games at which the victor's name was recorded, and which is calculated to correspond to the year 776 B.C. From this epoch, the Greeks measured time by olympiads or periods of four years. Thus, the 8d year of the 12th olympiad would be the year 720 B.C. The Roman era was reckoned from the founding of the city, being either 752 or 753 B.C. The Roman practice of dating events from the building of the city, seems to be the first instance of the method of reckoning time from a fixed point by single years. It thus forms one of the great stages in chronology. Of other eras we shall merely mention the Mohammedan, which commences with the flight of Mohammed, 622 A.D., and which is called the *Hedjrah* (q.v.). The Roman and Greek methods of measuring time continued to be in use long after the birth of Christ; the olympiads, indeed, appear to have been employed in Europe down to the 304th olympiad, or 440 A.D. From 312 A.D., however, the public mode of computation throughout the Roman empire was by indictions, which were periods of 15 years, beginning with that year (see *INDICTION*); and this mode was at one time

almost universally followed in the west. In France, it was not altogether discontinued till the end of the 15th century. The Christian era is said to have been first proposed in the year 527 A.D., and is now universally used in Christendom. Part of the business of C. is to determine the relationships of the different eras, so as to enable one to express, in the language appropriate to one mode of computation, the date of an event recorded in another. Owing to the birth of Christ being a comparatively recent event, the Christian era is attended by this inconvenience, that we must count backwards from it for the dates of occurrences prior to it. To obviate this, various comprehensive periods, such as the Julian and Louisian periods have been invented, which have the merit of being applicable to most events lying within the limits of history. See PERIOD.

Various systems of C., such as the Chinese, Babylonian, Egyptian, Indian, and Chaldean, are worthy of attention. Accounts of the periods which these nations respectively assign to their histories, will be found under the heads CHINESE EMPIRE, BABYLON, etc. Of *sacred C.* there have been various systems. In these the epochs are the creation of the world, and the flood; but the chief copies of the Bible do not agree as to the dates of these events. While the Hebrew text reckons 4,000 years from the creation to the birth of Christ, and to the flood 1656 years, the Samaritan makes the former much longer, though it counts from the creation to the flood only 1807 years. The Septuagint version differs from both. It removes the creation of the world to 6,000 years before Christ, and 2,250 years before the flood. These differences have never been reconciled. It is, now, however, universally admitted, that the creation of the world is not to be regarded as having occurred even so recently as 6,000 B.C. The modern understanding of the first chapter of Genesis leaves the period of the creation quite indefinite, and one scheme of interpretation stretches out the days of creation into periods of indefinite length. Of the *Newtonian C.*, all that can be said here is, that it was an attempt, now generally admitted not to have been very successful, to rectify the obvious blunders of ancient chronologers, by determining certain epochs by means partly of astronomical calculations, and partly of the critical examination of such chronicles as measured time by reigns and generations. By a very fine argument, the soundness of which has since been doubted, Newton set down the date of the Argonautic expedition as being 43 years after the death of Solomon, or 987 B.C.

The exact chronology as to many periods is largely conjectural. The Christian era (q.v.) starts at the birth of Christ. The years before are marked B.C. and those after, A.D. (Anno Domini). This era is now almost universally accepted. The Olympiad was a Greek era in periods of four years; the birth of Christ occurred in the middle of the fourth (some say in the second or third) year of the 194th Olympiad. The era of the foundation of Rome is usually assigned to 753 B.C. The era of the creation is fixed at many widely varying points. The reckoning of Constantinople, which is still used by the Greek church, makes it 5509 B.C.; the Abyssinian church, 5492; the Alexandrian church, 5502, and later 5492; the Jews, 3761. One writer on the C. of sacred history collected more than 200 different estimates of the era of the creation, the shortest being 8483, and the longest 6984 B.C. If such or such a date from the creation means anything, it is probably to be read by the period fixed by Dr. Usher, which was 4004 B.C. Yet it must be understood that, on this point, we are without the data for an accurate and positive chronology. There is an era of the creation used in India, which is only 3102 B.C. The era of Vicramyaditya in common use in India begins 56 B.C. The Spanish era, dating from the conquest of Spain by Augustus, 38 B.C., was in use in Spain, Portugal, North Africa, and Southern France. The era of Diocletian, or of the martyrs, is dated 284 A.D. The Mohammedan era, beginning at the time of the prophet's flight to Medina, is 622 A.D. As reckoned by our ordinary C., the precise dates of commencing the above and other eras are:

Grecian, Mundane.....	Sept. 1,	5598 B.C.
Constantinople, Civil.....	Sept. 1,	5508 "
Alexandrian.....	Aug. 29,	5502 "
Antioch, Mundane.....	Sept. 1,	5492 "
Julian Period.....	Jan. 1,	4713 "
Mundane, Usher.....	Oct.	4004 "
Mundane, Jewish.....	Oct.	3761 "
Abraham.....	Oct. 1,	2015 "
Olympiads.....	July 1,	776 "
Rome, foundation of.....	April 24,	753 "
Nabonassar.....	Feb. 26,	747 "
Metonic Cycle.....	July 15,	432 "
Macedonian, or Grecian....	Sept. 1,	812 "
Tyrian.....	Oct. 19,	126 "
Sidonian.....	Oct.	110 "
Cæsarian, of Antioch.....	Sept. 1,	48 "
Julian Year.....	Jan. 1,	45 "
Spanish Era.....	Jan. 1,	88 "
Actian.....	Jan. 1,	80 "
Augustan.....	Feb. 14,	27 "



Usual Christian (ours) .....	Jan. 1,	1 A.D.
Destruction of Jerusalem .....	Sept. 1,	69 "
Era of Maccabees .....	Nov. 24,	166 "
Era of Diocletian .....	Aug. 29,	284 "
Era of Ascension .....	Nov. 12,	295 "
Armenian .....	July 9,	552 "
Mohammedan, Hegira .....	July 16,	622 "
Persian of Yezdegird .....	June 16,	632 "

**CHRONOMETER**, or time-measurer, is the name given principally to such time-keepers as are used for determining the longitude at sea. The mechanism is essentially the same as that of a common watch; only the size is generally greater, and the balance-wheel is compensated for variations of temperature. See **HOROLOG**. See **ILLUS.**, **CIRCLE**, **MERIDIAN**, ETC., vol. III.

**CHRONOSCOPE**, an instrument contrived by sir Charles Wheatstone to measure the duration of certain short-lived luminous phenomena, such as the electric spark, of which the eye itself can be no judge, owing to the persistence of impressions of light on the eye after the cause of sensation has ceased. The phenomenon is observed by reflection in a mirror, in such rapid motion that the image of the luminous object would appear to describe a circle, supposing the luminosity to endure long enough. Should the phenomenon be instantaneous, the image will appear as a mere point; should it last for an appreciable time, the image will form an arc, greater or less, of the circle. The electric spark is found by this test to have no duration.

**CHRYSAALIS**, or **CHRYSAALID**, a name originally Greek, and strictly belonging to those *pupæ* of butterflies which are adorned with golden spots, but extended to the pupæ of lepidopterous insects generally, and even of other orders of insects. The chrysalids of lepidopterous insects are inclosed in a somewhat horny membranous case; sometimes very angular, sometimes nearly round; generally pointed at the abdominal end, sometimes at both ends; and before the caterpillar undergoes its transformation into this state, it often spins for itself a silken cocoon, with which earth and other foreign substances are sometimes mixed, so as to increase its size, and within which the chrysalid is concealed. See **LEPIDOPTERA**; **BUTTERFLY**; **HAWK-MOTH**; **MOTH**; and **SILK**.

**CHRYSANTHEMUM**. A name derived from two Greek words signifying *golden-flowered*, and given to the yellow florets of the species to which it was originally applied. The species are natives of northern Europe, the Canary Isles, East Africa, and the mountain and boreal region of Asia. Comparatively few occur in warm climates. About 150 species have been described by botanical authors, but according to the best authorities not more than 80 of these are worthy of being retained.

The genus as arranged by Bentham and Hooker is divided into five subordinate sections, which are founded upon variations in the form of the akenes and the amount of the pappus, and these comprise the 24 genera into which they were formerly separated by botanists under as many distinct names. It belongs to the Order **COMPOSITÆ**, and is characterized by heterogamous heads, with ligulate ray flowers in one row and mostly pistillate and sterile, perfect disk florets, naked receptacles, flat or hemispherical, akenes 5-10 ribbed, triquetrous or three winged, with or without a variously formed pappus. The plants are free bloomers both in the wild and cultivated state. The heads are solitary on long peduncles, or corymbose. Usually the rays spread wide open and are conspicuously showy; white, yellow or rose-purplish in tint, while the disk flowers are for the most part yellow.

None of the species are indigenous to the United States, but seven or eight have been introduced from abroad, and have become more or less extensively naturalized. The best known of these is *C. Leucanthemum* L., or ox-eye daisy, which grows abundantly in pastures throughout the Atlantic states. It is known to farmers as white-weed, and by many regarded as a great pest which it is difficult to eradicate from mowing fields. Another species, *C. vegetum* L., the corn-marigold of Europe, which bears pretty golden ray and disk florets, has been found running wild over fields at Oakland, California. An elegant species from the Canaries, *C. frutescens* L., known in France as *Marguerite*, and widely cultivated in that country for ornamental purposes, has found its way into other lands, and is grown either in pot culture or, where the climate will allow, in the open air. The writer saw it in close hedges, three or four feet high, growing vigorously in the plazas of Valparaiso and Copiapo, Chile.

The chrysanthemum has, of late, become as much of a popular craze in portions of Germany, in England, and the United States as ever was the tulip in Holland. The Chinese and Japanese species, *C. Indicum*, and *C. Sinensis*, are the prolific parents of the almost innumerable forms which adorn our gardens, parks, and houses, and which give rise to the gorgeous autumnal exhibitions that are held in London, Boston, New York, and Philadelphia. The diversity of color, shape, and size which have been developed in these flowers is simply amazing, over 500 distinct varieties having been, it is stated, produced at one exhibition alone. They range all the way from the pompon, or button form, to the huge head that measures nearly eight inches in diameter, and with ray florets three or four inches in length, each head enough of itself to constitute a bouquet. In shape they are quilled or plain, double, semi-double, and single, with florets erect or reflexed. In color they present all the hues of the rainbow, some of them in brilliancy

and combination of tints rivalling the plumage of tropical birds. In shape there are scarcely any bounds to the curious and elegant varieties which have been developed. Now they have the appearance of fleecy balls, now the slender rays of one color spread out horizontally, while the disk florets of a different hue twist about themselves spirally; and again others have the appearance of tassels composed of various sorts of richly colored silk, while others still seem constructed of strips of gaudy paper or fringed ribbons. The species are generally wanting in fragrance, but recently gardeners have succeeded in producing several varieties which are said to exhale a strong violet scent, and probably it is only a question of time when this quality will be developed to a greater degree, so flexible are these flowers in the hands of a skilful florist. The different varieties are obtained from seedlings, and hybridization is seldom resorted to, the variations occurring spontaneously. With these seedlings in hand, the main effort among competitors for prizes is to raise large flowers and high and symmetrical pot plants, and these are secured principally by careful pruning, disbudding and potting at the right season.

It is not strange that the chrysanthemum should be popular. The propensity of the flowers to sprout constantly stimulates the expectation of varieties. They are of the easiest culture, growing in any garden soil. They blossom late in the year, and fill the parlor with bloom at a season when everything else falls.

**CHRYSE**, the name given by the ancients to regions now known as Indo-China. It is a literal version of the Sanskrit *Suvarnabhumi*, or Golden Land, applied in ancient India to those regions.

**CHRYSELEPHANTINE** (Gr. from *chrysos*, gold, and *elephas* ivory), the art of making images of gold and ivory, was extensively practiced amongst the Greeks. Winckelmann has calculated that about 100 statues of this kind are mentioned by the ancients. The colossal works executed by Phidias at Athens, in the time of Pericles, are the most famous of this class, the greatest being the Pallas of the Parthenon. It was 26 cubits high, and represented the goddess in armor, covered with a long robe. The famous Olympian Jupiter of Phidias, executed in the same materials, was also a world-wide wonder. The combination of gold and ivory was chiefly used in temple statues; and though the execution of the more famous works of this class belongs to an advanced period of art, the use of various materials in the same statue was very ancient, and probably borrowed from the custom of adorning the wooden images of the earliest time with the precious metals. See SCULPTURE.

**CHRYSIPPUS**, an eminent Stoic philosopher, was b. about 280 B.C., at Soli in Cilicia. He came to Athens when still a youth, and eagerly addicted himself to philosophical pursuits. His principal master was Cleanthes, although he is said to have also studied under the academic teachers, Arcesilaus and Lacydes, and learned from them what were the objections urged by skeptics against the doctrines of the Stoics. He had the reputation of being the keenest disputant of his age, and was happily described as "the knife for the academic knots." In fact, his logic was held to be so convincing, that people were wont to say: "If the gods make use of dialectic, it can only be that of Chrysippus." It is also related of him, that he told Cleanthes he merely wanted to know the principles of his system, as he intended to find arguments for them himself; and this story appears to indicate his true position in philosophy. He was not the creator of a new system, but the expounder of an old. C.'s industry was very great. He seldom wrote less than 500 lines a day, and is said to have composed more than 700 works. Many of these, however, were compilations, and were not characterized by great beauty of style. Only a variety of fragments remain, which have been edited by Petersen (*Philosophia Chrysippea Fundamenta*, Altona and Hamburg, 1837).

**CHRYSIDÆ**, a Linnæan genus of hymenopterous insects, now constituting a family *chrysidæ*, allied to the *ichneumonidæ*, and forming a connecting-link between them and bees, wasps, etc. The French call them *Guêpes dorées* (gilded wasps), and they sometimes receive the English names of *golden-tailed* and *ruby-tailed flies*. They delight in sunshine, and may be seen poised in the air—the motion of their wings being so rapid as to render the body alone of the insect visible.

**CHRYSOBALANA CEE**, or **CHRYSOBALANÆÆ**, according to some botanists, a distinct natural order of plants; according to others, a sub-order of rosacæ (q.v.). They are distinguished from the other plants usually included in the order rosacæ by their irregular petals, and by having the stamens also irregular, either in size or position; the ovary stalked, its stalk adhering on one side to the calyx, the style proceeding from its base. The fruit is a drupe of one or two cells. The species are trees or shrubs, natives generally of tropical and sub-tropical regions. About 60 species are known. The fruit of many is eatable, as the cocoa plums (q.v.) of the West Indies (*chrysoalanus*), the fruit of *parinarium excelsum* in Sierra Leone, and that of *moquilea grandiflora* in Brazil. The kernels of some resemble sweet almonds, as those of *parinarium campestre* and *P. montanum*. A useful oil is expressed from the seeds of *prinsepia utilis*, a spiny plant.

**CHRYSOBERYL**, a gem almost as hard as sapphire, and the finer specimens of which are very beautiful, particularly those which exhibit an opalescent play of light. Lapidaries sometimes call it oriental or opalescent chrysolite. It is of a green color, inclining to yellow, semi-transparent, or almost transparent, and has double refraction. It occurs crystallized in six-sided prisms; often in macles, or twin crystals. It is found in granite, in sandstone, and in alluvial soil; in Ceylon, Pegu, Siberia, Brazil, and Connecticut. It

is composed of alumina, glucina, and a little protoxide of iron; the alumina being about 80 per cent of the whole.

**CHRYSOGLLOLA**, or **COPPER-GREEN** (Gr. gold-glue), an ore of copper, found in Cornwall and in many parts of the world, but particularly in Wisconsin and Missouri, where it is so abundant as to be worked for copper.

**CHRYSOOLITE** (Gr. golden-stone), a mineral composed of silica, magnesia, and protoxide of iron; of a fine green color, with vitreous luster; transparent, and having double refraction; in hardness, about equal to quartz; and with conchoidal fracture. It often crystallizes in four-sided or six-sided prisms, variously modified. Very fine specimens are brought from Egypt and from some parts of the east, also from Brazil. C. is used by jewelers as an ornamental stone, but is not highly valued. *Olivine*, which occurs generally massive, in grains and roundish pieces, and is frequent in volcanic countries, and found in the igneous rocks of some parts of Scotland—as on Arthur's Seat—is regarded as a coarse variety of chrysolite.—The chrysoberyl (q. v.) is sometimes called C. by jewelers.

**CHRYSOLO'RAS, MANUEL**, a learned Greek of Constantinople, was b. in the middle of the 14th century. He is regarded as the first who transplanted Greek literature into Italy. About the year 1391, the Byzantine emperor, John Palæologus, sent C. to England and Italy to entreat assistance against the Turks. This mission made C. known in Italy, and, in 1397, he left his native land and went to Florence, where, as teacher of Greek literature, he was highly esteemed and admired. Leonardo Bruno, Poggius, Philépphus, Guarinus of Verona, and other eminent scholars, were pupils of his. He was afterwards employed in public services—especially in mediating a union of the Greek with the Roman church—by Pope Gregory XII. In 1413, C. went with John XXII. to the council of Constance, where he died 1415. Besides theological works, his *Erotemata*, or "Accidence of the Greek Language" (Venice, 1484), has been preserved. Manuel C. must be distinguished from his nephew, JOHN CHRYSOLORAS, who also went to Italy and gave lessons in Greek.

**CHRYSOMELA** and **CHRYSOMELINÆ**. See GOLDEN BEETLE.

**CHRYSOPHYLLUM**. See SAPOTACEÆ, MONESIA BARK, and STAR APPLE.

**CHRYSO'PRASE** is merely a variety of chalcedony, but is valued far above common chalcedony as an ornamental stone; so that a stone of this kind, fit for mounting in a ring, is worth from \$50 to \$100. It is of a fine apple-green color in choice specimens, but inferior ones exhibit other shades of green, and it is sometimes spotted with yellowish-brown. It is often set in a circlet of diamonds or pearls. Unfortunately, it is apt to lose its color through time, particularly if kept in a warm place; but dampness is favorable to its preservation, and it is therefore sometimes kept in damp cotton. It is found in lower Silesia—where the search for it was particularly encouraged by Frederick the Great—and in Vermont. The inferior specimens are made into brooches, necklaces, etc.; and those still coarser, into snuff-boxes, seals, cups, etc.—The C. of the ancients was a stone of yellowish-green color, but it is not certain what it was.

**CHRYSO'PS**. See CLEG.

**CHRYSO'STOM, JOHN** (Gr. *Chrysostomos*, golden-mouth; so named from the splendor of his eloquence), was b. at Antioch in 347 A.D. His mother Anthusa was a pious woman, wholly devoted to her son, who grew up under her loving instructions into an earnest, gentle, and serious youth, passing through, as Neander significantly observes, none of those wild, dark struggles with sinful passions which left an ineffaceable impress on the soul of Augustine, and gave a somber coloring to his whole theology. He studied oratory under Libanius, a heathen rhetorician; soon excelled his teacher; and, after devoting some time to the study of philosophy, retired to a solitary place in Syria, and there read the Holy Scriptures. The ascetic severity of his life and studies brought on an illness which forced him to return to Antioch, where he was ordained deacon by Bishop Meletius in 381, and presbyter by Bishop Flavianus in 386. The eloquence, earnestness, and practical tone of his preaching excited the attention of Jews, heathens, and heretics, and secured for him the reputation of the chief orator of the eastern church. In 397, the eunuch Eutropius, minister of the Emperor Arcadius, who had been struck by the bold and brilliant preaching of C., elevated him to the episcopate of Constantinople. C. immediately began to restrict the episcopal expenditure in which his predecessors had indulged, and bestowed so large a portion of his revenues on hospitals and other charities, that he gained the surname of "John the Almoner." He also endeavored to reform the lives of the clergy, and sent missionaries into Scythia, Persia, Palestine, and other lands. His faithful discharge of his duties, especially in reproof of vices, excited the enmity of the patriarch Theophilus and of the Empress Eudoxia, who succeeded in deposing and banishing him from the capital. He was soon recalled, to be banished again shortly afterwards. He now went to Nicæa, in Bithynia; but was from thence removed to the little town of Cucusus, in the desert parts of the Taurus mountains. Even here his zeal was not abated. He labored for the conversion of the Persians and Goths in the neighborhood, and wrote the seventeen letters (or rather moral essays) to Olympias, to whom he also addressed a treatise on the proposition—"None can hurt the man who will not hurt himself." The emperor, enraged by the general sympathy

expressed towards C. by all true Christians, gave orders that he should be more remotely banished to a desolate tract on the Euxine, at the very verge of the eastern Roman empire. Accordingly, the old man was made to travel on foot, and with his bare head exposed to a burning sun. This cruelty proved fatal. C. died on the way at Comanum, in Pontus, Sept. 14, 407 A.D., blessing God with his dying lips. The news of his death excited much sorrow among all pious Christians, for C. was a man who drew the hearts of his fellows after him; a lovable, manly Christian, hating lies, worldliness, hypocrisy, and all manner of untruthfulness, with that honest warmth of temper which all vigorous people relish. A sect sprang up after his death, or martyrdom as they conceived it, called *Johannists*, who refused to acknowledge his successors; nor did they return to the general communion till 438, when the Archbishop Proclus prevailed on the emperor Theodosius II. to bring back the body of the saint to Constantinople, where it was solemnly interred, the emperor himself publicly imploring the pardon of heaven for the crime of his parents, Arcadius and Eudoxia. The Greek church celebrates the festival of C. on the 13th of Nov.; the Roman, on the 27th of January. In his *Homilies* (Thomas Aquinas said he would not give in exchange those on St. Matthew for the whole city of Paris) C. displays superior powers of exegesis. In general, he rejects the allegorical system of interpretation, and adheres to the grammatical, basing his doctrines and sentiments on a rational apprehension of the letter of Scripture. He is, however, far from being a bibliolater. He recognized the presence of a human element in the Bible as well as a divine; and instead of attempting, by forced and artificial hypotheses, to reconcile what he thought irreconcilable in Scripture statements, he frankly admitted the existence of contradictions, and shaped his theory of inspiration accordingly. But his greatest and noblest excellence lay in that power, springing from the fervor and holiness of his heart, by which the consciences of the proud, the worldly, and the profligate were awakened, and all were made to feel the reality of the gospel message. The surname C. was first applied some time after his death, and, as it is supposed, by the sixth oecumenical council in 680. C.'s works are very numerous, and consist of, 1st, *Homilies*, on parts of Scripture and points of doctrine; 2d, *Commentaries*, on the whole Bible (part of which has perished); 3d, *Epistles*, addressed to various people; 4th, *Treatises*, on different subjects (such as Providence, the Priesthood, etc.); and 5th, *Liturgies*. Of these the most valuable, as well as the most studied, are the *Homilies*, which are held to be superior to everything of the kind in ancient Christian literature.

The most correct Greek edition of C.'s works is that by Henry Savil (8 vols., Eton, 1615); and the most complete Greek and Latin edition is that by Montfaucon (18 vols., Par. 1718-38; republished in 1834-40). The best authority in regard to C. is Neander, who, besides treating of his life and labors in his *Kirchengeschichte*, published a life of this eminent father.

**CHRYSTYPE** (Gr. *chryso*, gold; *typos*, impression), a photographic process invented by sir John Herschel, and depending for its success on the reduction of a persalt of iron to the state of protosalt by the action of light, and the subsequent precipitation of metallic gold upon this protosalt of iron. The process is conducted as follows: Good paper is immersed in a solution of ammonio-citrate of iron of such a strength as to dry into a good yellow color, without any tinge of brown in it. It is then exposed to light under a negative until a faint impression is obtained. A neutral solution of chloride of gold is then brushed over the paper, when the picture immediately appears, and is rapidly developed to a purple tint. It should then be freely washed in several changes of water, fixed with a weak solution of iodide of potassium, again thoroughly washed and dried. The action of the iodide of potassium is to convert any unaltered chloride of gold into a soluble double iodide of gold and potassium, thus rendering the picture permanent.

**CHYZANOWSKI**, ADALBERT, 1788-1861; a native of Poland, who participated in Napoleon's Russian campaign, in the engagements at Leipsic, Paris, and Waterloo. After Napoleon's final defeat he served in the Russo-Polish army, and was under Diebitsch in Turkey in 1829. In the Polish revolution of 1830 he served with distinction, rose to the rank of gen. of division, and was made governor of Warsaw. He fell under suspicion of friendliness to the Russians, and was from time to time under a sort of ostracism. In 1849, he was chosen by Charles Albert commander-in-chief of the Sardinian forces in the short-lived revolution of that period. Ramorino and C. were charged with treachery, and the former was put to death. Some years later C. emigrated to the United States. He died in Paris.

**CHUB**, *Leuciscus cephalus*, a fish of the family *cyprinidae*, of the same genus with the roach, dace, bleak, minnow, etc. See *LEUCISCUS*. The color is bluish-black on the upper parts, passing into silvery white on the belly; the cheeks and gill-covers rich golden yellow. The C. rarely attains a weight exceeding 5 lbs. It is plentiful in many of the rivers of England, and occurs in some of those of the s.w. of Scotland. In the rivers of Cumberland it bears the name of *skelly*, supposed to have reference to the size of its scales; but the schelly of Ullswater lake is the gwyniad, and the C. is there called the *chevin*. It is found in many rivers of the continent of Europe; being the *semfling* or *bratfisch* of the Danube, and the *jeze* of the Oder. It spawns in April and May. It is not in great esteem for the table.

**CHUBB, CHARLES**, locksmith, was patentee of several improvements in "detector" locks originally patented by his brother, Jeremiah Chubb, of Portsea, in 1818. He was in the hardware business at Winchester and Portsea, previous to his settlement in London, where he died, 16th May, 1845. Under his son and successor, John Chubb (1816-72), further patents were taken out and improvements made in locks and safes, and the business was greatly developed.

**CHUBB, THOMAS**, an English rationalist, who wrote on religious questions during the first half of the last century, was b. at East Harnham, in Wiltshire, in 1679. He received but a meagre education in youth, and, after an apprenticeship to a leather glove and breeches maker in Salisbury, he became a tallow-chandler, in which business he continued to the end of his life. His first work, published in 1715, was entitled *Supremacy of God the Father Vindicated*. Besides this, he wrote a multitude of treatises on other religious subjects. Among these may be mentioned: *A Discourse on Reason, as a sufficient Guide in matters of Religion*; *On Sincerity*; *On Future Judgment and Eternal Punishment*; *Inquiry about Inspiration of the New Testament*; and *Doctrine of Vicarious Suffering and Intercession Refuted*. C. died in 1747.

**CHUCK-WILL'S-WIDOW**, *Antristomus Carolinensis*, a bird of the goatsucker family (*caprimulgidae*), a native of the southern parts of the United States. It has received its singular name from its note, which resembles these words or syllables articulated with great distinctness, and is repeated like that of the cuckoo, or of its own congener, the whip-poor-will (q.v.).

**CHUCUITO**, or **CHUQUITO**, a town of Peru, in the department of Puno, and 100 m. e.n.e. of Arequipa, on the w. shore of lake Titicaca, at the mouth of a stream flowing from the Andes. It was formerly of much greater size and importance than it is at present, having had, it is said, at the beginning of the 18th c., the incredible number of 800,000 inhabitants. Its present pop. is only about 5,000. In the province of the same name, of which it is the capital, there are mines of silver and gold, and interesting antiquarian remains.

**CHUMBUL'**, a river rising in the Vindhyan mountains, which form the southern limit of the basin of the Ganges. Its source, at a height of 2,019 ft. above the sea, is in lat. 22° 26' n., and long. 75° 45' east. During a generally n.e. course of 514 m., it receives many tributaries on both sides, till, in lat. 26° 30' n., and long. 79° 19' e., it enters the Jumna from the right, with such a volume of water, that, when itself flooded, it has been known to raise the united stream 7 or 8 ft. in twelve hours. The C. is remarkable, here and there, for the wildness of its current and the picturesque character of its banks.

**CHUNAM'**, the Indian name for a very fine kind of quicklime made from calcined shells or from very pure limestone, and used for chewing with betel (q.v.), and for plaster. Both recent and fossil shells are used for making chunam. Extensive beds of fossil shells employed for this purpose occur in the s. of India, particularly in low marshy situations near the sea-coast. The shells used are in the first place very carefully cleaned; they are then calcined in kilns, with wood charcoal. When chunam is to be used for plaster, it is mixed with fine river-sand, and thoroughly beaten up with water. A little *jaggery* (coarse sugar) is also added.

**CHUNARGUREH'**, or **CHAKAR**, a fortified t. on the right bank of the Ganges, 16 m. to the s.w. of Benares, and in the division of that name. It is in the district of Mirzapore, and lieutenant-governorship of the north-west provinces. The population of the town in 1891 amounted to 11,400. The fortress, which occupies the summit of a sandstone rock, contains the commandant's house, the hospital, the prison, and an ancient palace, with a deeply excavated well of indifferent water. The river in front is navigable at all seasons for vessels of from 50 to 60 tons.

**CHUND**, or **CHAND**, a Hindu writer of the 12th c., court poet to the last of the Hindu sovereigns of Delhi. He wrote in verse an immense encyclopædic work, including a history, and especially an account of the exploits of the author and of his master.

**CHUPRA**, a t. in India, in the province of Behar, Bengal, on the n. bank of the Ganges, 85 m. n.w. of Patna. It extends nearly a mile along the river, and has several pagodas, mosques, and churches. There is trade in cotton, sugar, and saltpeter. Pop. '91, 57,852.

**CHUQUISACA**, or **SUCRE**, the capital of Bolivia or Upper Peru, in lat. 19° 20' s., and long. 65° 30' west. It is situated on a table-land about 9,000 ft. above the sea, and has a pleasant climate. The town is well built, has a cathedral of great magnificence, a university, a college of arts and sciences, and a mining-school. C. was founded in 1588 by Pedro Auzures, an officer of Pizarro's, on the site of an old Peruvian town called "Choque Chaka," or "bridge of gold," "the treasures of the Incas having passed through it on their way to Cuzco." At one time, C. bore the name of La-Plata, on account of the rich silver mines in its vicinity. Pop. 20,000. C. gives name to a territory containing 288,710 whites, besides many native Indians. Near it are platinum and silver mines in operation; and in it are magnificent ruins of unknown origin. The second name is derived from the general who, in Dec., 1824, fought and won the last great battle for colonial independence at Ayacucho.

**CHUR** (Fr. *Coire*, anct. *Curia Rhetorum*), a t. of Switzerland, capital of the Grisons, in the valley of the Upper Rhine, in a fertile plain about 2000 ft. above the sea, and surrounded by high mountains, 60 m. s.e. of Zurich, on the Plessur, about a mile from its junction with the Rhine. It is of importance as standing on the great road to Italy by the Splügen and Bernardin passes, and thus possessing a considerable transit trade. C. stands on uneven ground, has narrow streets, and is divided into a high and low town. The bishop's palace, and the quarter around it, inhabited by the Roman Catholics, occupy the summit of an eminence, and are separated from the rest by walls and battlements, closed by double gates. In the same quarter stand the old cathedral, a round, arched, or Byzantine edifice, founded in the 8th c.; the church of St. Lucius or the *Dom*, a curious example of early pointed Gothic, including fragments of earlier buildings. It contains singular old carving, paintings, and statues, and also, it is said, the bones of St. Lucius, who was a British king. Behind the episcopal palace is a kind of ravine lined with vineyards. In the lower town there are also some very ancient buildings. Romansch is still spoken in the vicinity; a newspaper in this dialect is published in the town; and a considerable collection of Romansch literature is to be found in the library of the cantonal schools. There are several new roads leading in different directions through the Grisons; and a railway connects the town with Zurich and other places. There are manufactures of zinc wares and cutting tools. Population about 9400.

**CHURCH**, a word which signifies either a place of Christian worship or a collective body of Christian people. It is, in all probability, derived from the Greek adjective *kyriakos* (from *kyrios*, lord), the place of worship having been called the *Lord's house*, and the worshipers the *Lord's people*. The Scottish *kirk*, the German *kirche*, etc., are merely different forms of it.

Under the terms *apse* and *basilica* (q.v.), we have already explained that the earliest ecclesiastical structures of the Christians were copied or adapted not from the heathen or Jewish temple, as might have been anticipated, but from that peculiar combination of a hall of justice and a market-place to which the name *basilica* was given by the ancients. The reason of this selection is probably to be found, not so much in the spirit of opposition which no doubt existed between Christians and heathens, as in the essentially different conceptions which they formed of the character and objects of public worship. The rites of heathendom were performed exclusively by the priest, the people remaining without the temple; and the temple itself, which was lighted only from the door, or by the few lamps which burned around the image of the god, was regarded not as a receptacle for worshipers, but as the abode of the deity. The dark, mysterious character which thus belonged to it, rendered it equally unsuitable for the performance of liturgical services in which the people were to participate, and for the delivery of those public addresses which from the beginning were employed as a means of Christian teaching and exhortation. To such purposes, the prætor's court-room, with its surroundings, were readily adapted, by the few simple alterations which we have described in the articles referred to. But the *basilica*, as thus altered, was a mere utilitarian structure. It served the purposes of Christian worship, but there was nothing in its form which responded to the feelings of Christian worshipers, or tended to awaken Christian sentiments. Now, the cross (q.v.) had been used by Christians from a very early period to indicate their allegiance to the author of their salvation and the object of their faith; and gradually it had become the distinctive emblem of Christianity. Nothing, then, could be more natural than that when it became desirable to give distinctively Christian characteristics to what hitherto had been a heathen structure, this should be effected by such a modification of its form as should convert it into a representation of this sacred emblem. Nor did this alteration lead to any very extensive change on the form of the C., as it had hitherto existed. The *basilica*, as we have already explained, not unfrequently had side entrances, either in place of, or in addition to, that from the end. All that was requisite, then, to convert the simple parallelogram of which it consisted into a cross, was, that at each side of the building these entrances, in place of direct communications with the exterior, should be converted into passages, or arms running out at right angles, and more or less prolonged, according as the object was to attain the form of a Greek or of a Latin cross (see *Cross*). If the C. was to be in the form of a Greek cross, the arms were made of the same length with the other two portions into which they divided the building; whereas if the cross was to be a Latin one, the portion of the building which ran towards the w. was made considerably longer than either of the others. In either case, the arms running at right angles to the C., and directly opposite to each other, cut it across, and thus obtained the name of *transepts*.

The external form of the C. being thus indicated, we now proceed to explain its internal arrangements, and to enumerate the various adjuncts which in cathedrals and others of the larger churches frequently sprang up around it.

Over the point at which the arms or transepts intersect the body of the cross, a central tower or spire is very frequently erected. From this central tower, or, if the tower or towers are situated elsewhere, from this central point, the portion of the building which runs westward, to where the Gallæe or entrance chapel, or, in other instances, the

great entrance-door is situated, is called the nave (from *navis*, a ship), whilst the portion which runs eastward to where the altar, or high-altar, if there be several, is placed, is called the choir. In the larger and more complete churches, the nave, and frequently also the choir, are divided longitudinally by two rows of pillars into three portions, the portion at each side being generally somewhat narrower and less lofty than that in the center. These side portions are called the aisles of the nave, or of the choir, as the case may be. In some churches, the aisles are continued along the transepts, thus running round the whole C.; in others, there are double aisles to the nave, or to both nave and choir, or even to nave, choir, and transept. Behind, or to the e. of the choir, is situated the Lady's chapel, or chapel of the Virgin, with sometimes a number of altars; and it is not unusual for side chapels to be placed at different places along the aisles. These usually contain the tombs of the founder, and of other benefactors to, or dignitaries connected with, the church. The extent to which these adjuncts exist depends on the size and importance of the C., and they are scarcely ever alike in two churches, either in number, form, or position. Vestries for the use of the priests and choristers generally exist in connection with the choir. Along the sides of the choir are ranged richly ornamented seats or stalls, usually of carved oak, surmounted with tracery, arches, and pinnacles; and amongst these seats, in the case of a bishop's church, the highest and most conspicuous is the so-called *cathedra*, or seat for the bishop, from which the cathedral takes its name. The larger English cathedral and abbey-churches have usually a chapter-house attached to them, which is of various forms, most commonly octagonal, and is often one of the richest and most beautiful portions of the whole edifice. On the continent, chapter-houses are not so common, the chapter (q.v.) being usually held in the cathedral itself, or in one of the chapels attached to it. Cloisters (q.v.) are also frequent, and not unusually the sides of those which are furthest removed from the C. or chapter-house, are inclosed by other buildings connected with the establishment, such as a library, and places of residence for some of the officials of the cathedral. It is here that, in Roman Catholic churches, the hall, dormitories, and kitchens for the monks are commonly placed. Beneath the C. there is frequently a crypt (q.v.). In some cathedral churches, the crypt is in reality a second underground C. of great size and beauty. The baptistery (q.v.) is another adjunct to the C., though frequently forming a building altogether detached. Most of the parts of the C. which we have mentioned may be traced; but it must not be supposed that their position is always that which is there represented. The position of the nave, choir, or chancel, aisles, and transepts are nearly invariable, but the other portions vary, and are scarcely alike in two churches.

Churches are of five classes—metropolitan, cathedral, collegiate, conventual, and parish churches—and of these the first are, generally speaking, the most, and the last the least elaborate. In ordinary language, any building set apart for religious ordinances is called a church, though when of a minor kind it is more usually designated a chapel. After a long period of neglect and poverty of taste, the building of churches in a superior style, emulative of the older styles of architecture, has greatly revived, not only as regards the church of England, but the church of Scotland and nearly all dissenting bodies.

As applied to a collective body of Christian people, the word C. is the translation and equivalent of the Greek word *ecclesia* (Lat. *ecclesia*, Fr. *église*), used in the New Testament. It is common among Protestants to distinguish between the *visible* and the *invisible* C.—the invisible C. consisting of all those who are savingly or spiritually united to Christ, that is, of all true believers; the visible C. consisting of all who profess the religion of Jesus Christ. Roman Catholics do not in the same manner acknowledge the distinction between the visible and the invisible C., but regard a connection with the hierarchy, and consequent participation of ordinances, as establishing a connection with the true C. and with Christ. Protestants regard the C. as subsisting from age to age, in virtue of the authority of Christ, and through the faith of individual believers and their confession of him; Roman Catholics regard the apostolical succession of the hierarchy, and the regular administration of the sacraments, as essential to the continued existence of that *Catholic* or universal C. which Christ planted on the earth, and the existence of which he has promised to maintain throughout all ages. Protestants, in general, regard the C. of Rome and the Greek C. as forming part of the visible C. of Christ; but Roman Catholics are not accustomed to make a corresponding admission with respect to the Protestant churches. From the hierarchical principle of the C. of Rome and of the Greek C., results an employment of the term C. to designate the hierarchy alone, which is contrary to the principles of the reformation, although a tendency to it may be observed in some Protestant churches. It has been usual for Protestants to designate by the term C. the collective body of Christians in a particular country, distinguished by the name of that country; the greater number of Protestants (Episcopalians and Presbyterians) believing that such a portion of the universal C. may warrantably be associated under a common government; and in countries where religious liberty exists, diversities of opinion on points of doctrine and C. government have given rise to the existence of separate Christian associations, distinguished by names generally indicative of some of the peculiarities which characterize them; but these, however much they may differ on many points, do not in general hesitate to recognize each other as belonging to the universal visible C. of

Christ, whilst they retain in common the same great first principles of the Christian faith, and particularly the belief in one God and in the three persons of the Godhead, the incarnation of the Son of God, the atonement by Jesus Christ, and the work of the Holy Spirit. The term C., however, is regarded by Independents (q. v.) or Congregationalists as more strictly applicable to those who are united as worshipers in a particular place of worship, partaking of the Lord's supper together, and exercising discipline and C. government among themselves.

**CHURCH, BENJAMIN**, 1639-1718; a New England soldier who served with distinction in King Philip's war, and was commander in the fight in which Philip was killed. He commanded a number of expeditions against the Indians of New Hampshire and Maine. From his dictation and memoranda his son wrote a history of King Philip's war.

**CHURCH, FREDERICK EDWIN**, b. Conn., 1826; a pupil of Thomas Cole and a painter of eminence. The works which gave him prominence are a "View of East Rock, near New Haven," and "Scenes in the Catskill Mountains." He visited South America in 1853 and 1857; and in Ecuador and New Granada made sketches for a number of paintings, some of which have attained great celebrity, such as the "Heart of the Andes," "On the Cordilleras," and "Cotopaxi." Another celebrated work is the "Horse-shoe Fall, Niagara." He visited Jamaica, and afterwards Europe and the Holy Land. Some of his other works are "Damascus," "Jerusalem," "The Parthenon," and "Tropical Scenery."

**CHURCH, FREDERICK STUART**, American artist; b. Mich. 1841; member of the National Academy, Society of American Artists, and American Water-color Society. He made a specialty of animal and bird life; and also produced satirical work. Among his pictures are "Weirdness," "Mad as March Hares," and "The Sea Princess," in oils; and "Hard Times" and "The Phantoms," in water colors. He exhibited "St. Cecilia" in 1896.

**CHURCH, IRVING PORTER**, b. Ansonia, Conn., July 22, 1851; graduated at Cornell University, 1873; assistant professor of civil engineering there, 1876-92; and became professor of applied mechanics there, 1892. He published numerous text-books, including *Statics and Dynamics* (1886), *Mechanics of Materials* (1887), *Mechanics of Engineering, Notes and Examples in Mechanics* (1892).

**CHURCH, Sir RICHARD**, 1784-1873; an Englishman who held the principal command in the Greek war of independence. On the final establishment of the kingdom of Greece, he was made a councillor of state, and afterwards a member of the senate; and was for many years at the head of the army and navy.

**CHURCH, SANFORD ELIAS**, LL.D., 1815-80; b. N. Y.; bred to the law in which he speedily rose to a prominent position. In 1850 he was elected lieutenant-gov. of New York, and was re-elected in 1852; in 1857 he was elected controller, but twice afterwards defeated for the same office. In 1870 he was elected chief justice of the court of appeals, which position he held until his death.

**CHURCH-ALE**, in England, was an annual festival, held in a church-yard or near a church, at which much ale was used. It is said by some to have celebrated some anniversary, as the dedication of a church, or Easter or Whitsuntide. The profits were used for church repairs. Church-ales are now represented by village fairs, wakes, etc.

**CHURCH CALENDAR**, a table of the order and series of days, weeks, months, and holy days in the year. The name is derived from *calenda*, or first days of the Roman month. The earliest now existing which contains the Christian festivals is that of Silviu, 448 A.D. A fragment of a Gothic calendar remains, which probably belongs to the 4th century. The name is applied also to the *fasti* or catalogues for particular churches, of the saints most honored by them, such as bishops, martyrs, etc. At the reformation the German Lutheran church retained the Roman calendar. In 1850, a calendar was published for the evangelical church of Germany. It has been continued annually, and contains much interesting information, in addition to the table of feasts, fasts, etc. The full calendar of the church of England contains 9 columns, giving the golden number, days of the month, the dominical or Sunday letter, the calends, nodes and ides, the daily Scripture lessons, and the holy days of the church, together with some of the Roman festivals which have been retained, not as having any religious value, but because the practice of the courts, the habits of tradesmen, and the times of popular amusements had become interwoven with them. The calendar of the Protestant Episcopal church in the United States retains only the festivals which are referable to a Scriptural origin.

**CHURCH CONGRESS**, the name of free gatherings of ministers and laymen of the established church of England, annually convened for the discussion of ecclesiastical and religious questions. The first church congress was held in 1861 in Canterbury, and in the following years successively in Oxford, Manchester, Bristol, York, etc. The attendance is usually very large, and comprises many bishops and lower dignitaries. Full reports of the proceedings of each session are published. Such meetings, having the advantage of free interchange of views, but with no claim to ecclesiastical authority, have been found very profitable in this country; and though in the Protestant Episcopal church the sentiment in their favor has not been unanimous, they are winning for themselves an established position through either enthusiastic advocacy or silent consent.



**CHURCH DIET**, the free gathering of ministers and lay members of German Protestant churches. Such meetings arose in consequence of the revolutionary movements of 1548, which threatened to endanger the influence of the evangelical church upon society. Members of the Lutheran, Reformed, the United Evangelical, with the high church "confessionals" participated in the earlier meetings; but after 1860 only the evangelical parties were represented. Annual reports are published.

**CHURCH DISCIPLINE**, *Disciplina ecclesiastica*, includes all the means employed by the Christian church, besides the ministration of word and sacraments, to secure on the part of its office-bearers and members a faithful adherence to their profession and a corresponding blamelessness of life. It rests upon the authority of Christ, and at the same time necessarily arises, in some form of it, out of the very constitution of the church as a society. Among the early Christians, it soon assumed forms of great severity towards offenders, especially towards the *lapsed* (q.v.). At a later period, the discipline of the church was chiefly exercised with respect to persons accused of heresy and schism. The penances of the church of Rome have long formed an important part of its discipline, and therewith its *indulgences* (q.v.) are closely connected, as well as its doctrine and rule of *auricular confession* (see **CONFESSION**). In the Protestant churches, public confession of sins by which public scandal has been given, and submission to public rebuke, are sometimes required. Practices more analogous to those of the primitive church were established in many churches after the reformation, but in general have fallen greatly, or entirely, into disuse. The power of exclusion from the Lord's Supper, and from the rights and privileges of church membership, is, however, generally retained and exercised, until, by profession of repentance, and by reformation of life, the cause of such exclusion is removed; and ministers or other office-bearers are, upon offense given in their doctrine or conduct, suspended from their functions, or altogether deposed from their office. The exercise of C. D. belongs more or less exclusively to a hierarchy, or to the office-bearers assembled in church-courts, or to the members of each congregation, according as the church is Episcopalian, Presbyterian, or independent in its church government. There is an increasing tendency among Christians in general to scrutinize closely the claim of right to exercise C. D., and the limits within which it may be exercised.

**CHURCH GOVERNMENT**. The Christian church, like every other society, must have a certain constitution and rules according to which its affairs are administered. It is disputed, however, among Christians, how far this constitution has been defined, or these rules prescribed by divine authority, and how far they have been left to the discretion of men. The form of C. G. depends primarily on the idea entertained of the constitution of the church. Congregationalists, or independents (q.v.), accordingly place all C. G. in the hands of the members of the congregation and the office-bearers whom they have elected. This theory of C. G. is maintained by many Baptists and others, who, for various reasons, assume different denominations.—Episcopalians and Presbyterians agree that many congregations are to be united under a common government; but this, according to Presbyterians, is properly carried on by ministers and elders of these congregations meeting for this purpose on a footing of equality; whilst, according to Episcopalians, it is more or less absolutely in the hands of bishops, who are superior to the mere pastors of congregations. See **EPISCOPACY** and **PRESBYTERIANISM**.

**CHURCH HISTORY** or **ECCLESIASTICAL HISTORY**. The history of the Christian religion and church forms one of the most important parts of the general history of mankind, and is intimately connected not only with the political history of the world, but with the history of philosophy, of literature, and of civilization. The sources and authorities are extremely various, and their due appreciation often requires as much judgment as their exploration requires toil. Church history is either general—embracing a view of the affairs of the church in the whole world from the beginning to the present day—or particular, relating to some particular country, or time, or portion of the church. By some authors, it has been treated chiefly with regard to the outward affairs of the church; and by others, with reference to doctrine, morals, and the evidences of spiritual life; whilst others still have devoted their attention chiefly to the forms of worship, the constitution of the church, and other things generally comprehended under the name of ecclesiastical antiquities. All these, of course, have important relations to each other. The earliest writers of church history were in general mere chroniclers, following the order of time; in the great work of the Magdeburg centuriators, a method was adopted, of which there had been previous examples, and which afterwards became frequent, of treating each century separately, the centuries being subdivided according to convenience of subjects; but arrangements less mechanical and arbitrary have been adopted by the most eminent modern authors. With much diversity on minor points, there is a general agreement in dividing the whole history of the church into three great periods: the first, from our Savior to the time of Constantine; the second, from that time to the reformation; and the third, from the reformation to the present day.

The earliest facts of C. H. are to be learned only from the New Testament, after which, however, the epistles and other writings of the apostolic and other primitive fathers afford sources of information, unfortunately very scanty; Hegesippus, who

wrote about the middle of the 2d c., has transmitted to us some very imperfect memoirs of these early times; but the first proper ecclesiastical history is that of Eusebius of Cæsarea (324). This work was continued to the 5th c. by Socrates Scholasticus, Hermias Sozomenus, and Theodoret. Similar compilations were executed by Lactantius, Epiphanius, Hieronymus, Theodoret of Cyrus, Philostorgius, and Zosimus. In the 6th c., the chief ecclesiastical historians are—Theodorus Lector, Evagrius, and Nicephorus Callistus; in the 8th, the venerable Bede and Paul Warnefried; in the 9th, Theophanes Confessor, Claudius of Turin, Haymo of Halberstadt, Scotus Erigena, and Hinkmar of Rheims; in the 12th and 13th, Photius, Simeon Metaphrastes, Theophylact, Matthew Paris, Albert of Strasburg, and Ptolemy of Lucca; in the 15th, Laurentius Valla is the most conspicuous name. Protestant writers were the first to treat C. H. in a critical and scientific manner. This was natural, for their position as apparent schismatics compelled them to vindicate historically the changes which they had wrought in the character of the church. Hence their writings were of an apologetic and polemical cast. The first work of this kind was the *Magdeburg Centuries* (q.v.), published by Matthias Flacius. Special histories of the reformation were composed by Sleidan and Seckendorf. In the 17th c., Calixtus distinguished himself in this department, and after him Thom. Illig, Adam Rechenberg, and Thomasius. The new life that awoke in Germany towards the middle of the 18th c., produced a multitude of church historians, of whom we can only afford to mention Arnold, C. M. Pfaff, Mosheim, Semler, and J. Matth. Schröckh; while in still more recent times, Marheineke, Danz, Neander, Gieseler, and Hagenbach have achieved the highest distinction in the same sphere of labor. But others besides the Lutheran divines have rendered valuable services to church history. The reformed church boasts the eminent names of Du Moulin, Joh. Dalläus, Blondel, Hottinger, Spanheim, Turretin, Venema, Jablonski, and recently, D'Aubigné; while among Englishmen, Usher, Pearson, Bingham, Lardner, and recently, Milman and Maurice, have won a distinguished place. Scotland has few names, the chief being Calderwood, Wodrow, M'Crie, and recently Cunningham. In the Roman Catholic church, since the period of the reformation, ecclesiastical historians have rarely manifested a dispassionate and philosophic spirit. They have appeared mainly in the character of defenders of the papacy. The greatest names in C. H. in Catholic France are Tillemont, Bossuet, Bayle, Du Pin, Thomassin, and Fleury. Among the Italians may be mentioned Orsi, Saccharelli, Pallavicini, Guicciardini, and Muratori; and among the Roman Catholics of Germany, Dannenmayr, count Stolberg, Ritter, Hortig, Dollinger, etc.

For the benefit of the English reader, it may be stated that the extensive, profound, and philosophic work of Dr. Augustus Neander has been translated from the original German into English, and is published in 10 vols. by Bohn. See ECCLESIASTICAL HIST.

**CHURCHILL**, a co. in w. central Nevada, intersected in the n. part by the Central Pacific railroad; 4852 sq. m.; pop. '90, 708. It is watered by the Humboldt, Carson, Walker, and other rivers. Among the minerals are gold, silver, salt, soda, etc. Co. seat, Stillwater.

**CHURCHILL**, CHARLES, an English poet, now remembered almost as much for his profligacy as his poetry, was b. at Westminster, where his father was a curate, in 1731. He was educated at Westminster school, and in his 17th year made a clandestine marriage. In 1756, he was ordained, and, two years afterwards, succeeded his father as curate of St. John's, Westminster. Soon after his transference here, he fell into habits very ill-becoming his clerical character. In 1761, he published (at his own risk, the booksellers having refused him five guineas for it) *The Rosciad*, a satire on theatrical managers and performers, which displayed much critical acumen, clever sarcasm, and no little humor, and enjoyed such an immense success that C., who on its publication had withheld his name, was soon delighted to avow himself author. In the same year appeared *The Apology*, a bitter satire on some of his critics, which added alike to his purse and his notoriety. He now totally neglected the duties of his office, was a constant attendant at theaters, and altogether led a most dissolute life. His parishioners were scandalized, and his dean remonstrated, whereupon C., to show his utter contempt for the ministerial profession, appeared in a blue coat, gold-laced hat and waistcoat, and large ruffles. He was obliged, however, to resign his preferment, which pecuniary sacrifice was little, as his works brought him considerable sums. He further displayed the complete licentiousness of his nature by separating from his wife, and seducing the daughter of a tradesman in Westminster, and by endeavoring to excuse his vices in a poem called *Night*, on the ground that avowed profligacy was more harmless than profligacy practiced in concealment. The boon-companion of as great a debauchee as himself—Wilkes—he contributed to the pages of the *North Briton*, among other things, *The Prophecy of Famine—A Scots Pastoral*, one of the best of his satires. Among his other works, all more or less satirical, are the *Epistle to Hogarth*; *The Author*; *The Candidate*; *The Ghost*; *Gotham*; *The Duelist*, etc., of which *The Author* is the best. He died Nov. 4, 1764, while on a visit to Wilkes at Boulogne. C.'s thorough reprobacy has naturally led to an unjust depreciation of his poetical abilities. See *Poetical Works* by Took (1867), with *Life* by Hannay.

**CHURCHILL**, JOHN. See MARLBOROUGH.

**CHURCHILL, MISSINNIPPI or ENGLISH, RIVER**, in British North America, rising in Methy lake, and running s.e. through Buffalo and La Crosse lakes, to Hudson's Bay; length about 700 miles.

**CHURCHILL, THE RIGHT HON. LORD RANDOLPH HENRY SPENCER**, second son of the duke of Marlborough, was born in 1849 and educated at Oxford. In 1874 he married Miss Jennie Jerome, daughter of Mr. Leonard Jerome, of New York, and in the same year entered the House of Commons as member for Woodstock. For several years he seldom addressed the House, but the Conservative party's defeat in 1880 seems to have roused Lord Randolph to exert himself as a leader. In the years that immediately followed he distinguished himself as a ready, audacious, and unconventional debater, attracting particular attention by his free criticism of Mr. Gladstone, who was then premier, and forming with Mr. Gorst and Sir H. D. Wolff what was known as the Fourth Party. He succeeded so far in attaining prominence that he became successively chairman of the Conservative Union (1884), Secretary of State for India (1885), leader of the House of Commons and Chancellor of the Exchequer (1886). This post he resigned in the same year. Lord Randolph represented what is known as the "Tory Democracy" (q.v.). Much of his political success was recognized as due to the energy and enthusiasm of his wife, who has been very prominent in the councils of the Primrose League (q.v.). He died of paresis, Jan. 24, 1895.

**CHURCH MUSIC.** See ANTHEM, ANTIPHONY, CHORALE, HYMNS, MASS, PLAIN SONG.

**CHURCHING OF WOMEN**, a religious usage prevailing in the Christian church from an early period, of women, on their recovery after child-bearing, going to church to give thanks. It appears to have been borrowed from the Jewish law (Lev. xii. 6). In the church of the early ages, it was accompanied with various rites; and in the church of Rome and Greek church, it is imperative. In the church of England, also, a service for the C. of W. finds a place in the liturgy.

**CHURCH OF ENGLAND.** See ENGLAND, CHURCH OF.

**CHURCH OF ENGLAND, FREE.** See REFORMED EPISCOPAL CHURCH.

**CHURCH OF GOD.** See WINEBRENNERIAN.

**CHURCH OF SCOTLAND.** See SCOTLAND, CHURCH OF.

**CHURCH RATES**, in England, a tax or assessment laid on the parishioners and occupiers of land within a parish, by a majority of their own body in vestry assembled, for the purpose of upholding and repairing the fabric of the church and the belfry, the bells, seats, and ornaments, the churchyard fence, and the expenses (other than those of maintaining the minister) incident to the celebration of divine service. The parishioners are convened for this purpose by the church-wardens (q.v.). The chancel (q.v.) being regarded as belonging peculiarly to the clergy, the expense of maintaining it is laid on the rector or vicar, though custom frequently lays this burden also on the parishioners, as in London and elsewhere.

The C. R. were anciently a charge on the tithes of the parish, which were divided into three portions: one for the structure of the church, one for the poor, and the third for the ministers of the church. This distribution is said to have originated with pope Gregory, who enjoined St. Augustine thus to divide such voluntary offerings as might be made to his missionary church in England. A canon of archbishop Ælfric in 970, and an act of the Wittenagemote in 1014, in Ethelred's time, have been quoted in proof of the recognition of this rule by our Saxon fathers. It seems to have been their custom, also, to devote to the repair of each church a portion of the fines paid for offenses committed within the district attached to it; and every bishop was bound to contribute to the repair of his own church from his own means. A third of the tithes thus originally devoted to the repairs of churches, continued to be applied to that purpose under the Normans, down to the middle of the 13th c.; and the manner in which this burden came to be shifted to the parishioners, has been a subject of much discussion among legal antiquaries. Lord, then sir John, Campbell, who published a pamphlet on the subject in 1837, is of opinion that the contributions of the parishioners were at first purely voluntary, and that the custom growing, it at last assumed the form of an obligation, and was enforced by ecclesiastical censures. The care of the fabric of the church, and the due administration of its offices, are laid upon the ministers and the church-wardens conjointly, and the latter may be proceeded against by citation, in the ecclesiastical courts, should they neglect these duties. But there is no legal mode of compelling the parishioners as a body to provide the rate; and this circumstance has occasioned much difficulty in imposing the tax in parishes in which dissent is prevalent, and led to many churches falling into a partially ruinous condition. The proper criterion for the amount of C. R. is a valuation of the property within the parish, grounded on the rent that a tenant would be willing to pay for it. Glebe land, the possessions of the crown in the actual occupation of the sovereign, and places of public worship, are not liable for C. R.; but there is no other exception as regards immovable property, and in some parishes, custom even extends it to stock in trade. It has been often decided in the courts that a retrospective church-rate—i.e., a rate for expenses previously incurred—cannot be validly imposed. Much difficulty has been experienced in recovering the rates imposed by the parish on individuals refusing to pay. Previous to 58 Geo. III. c. 127, the only mode was by suit in the ecclesiastical court. That statute, however, in all cases under £10.

empowered the justices of the peace of the county where the church was situated, on complaint of the church-wardens, to inquire into the merits of the case, and order payment. Against the decision of the justices, an appeal lies to the quarter-sessions. In 1868, an end was put to all parochial contentions by enacting that no suit or proceeding should thereafter be allowed in any court to enforce or compel payment of a church-rate, except where a local act authorized this rate. But except so far as related to the compulsory payment of these rates, the church-wardens might, as before, make, assess, receive, and deal with such rates. In each district parish, the inhabitants may treat their own church as if it were their parish church, and make and receive rates for the repair of the same. A body of trustees may now be appointed in each parish to receive contributions for ecclesiastical purposes in the parish.

**CHURCH-WARDENS**, in England, are ecclesiastical officers, elected sometimes by the parishioners and minister jointly, sometimes by the minister alone, and sometimes by the parishioners alone, for the purpose of protecting the edifice of the church, superintending the celebration of public worship, and to form and execute other parochial regulations. They are generally two in number. See **CHURCH RATES**, **PARISH**, **VESTRY**. In the Prot. Epis. church of the U. S., wardens are annually elected by each parish in Easter week; their duties, which are regulated by diocesan and not by general canons, being virtually the same as those of the corresponding English officials, omitting such as relate to a church established by the state.

**CHURCH-YARD**. See **BURIAL**, **CEMETERY**.

**CHURN**, a machine for agitating milk or cream for the production of butter. The principle of the operation is considered in the article on **BUTTER**. Of the great variety of forms that have been given to the machine, it is very difficult to determine which deserves the preference. It is obvious that the more thorough and uniform the agitation, the more completely will the butter be separated from the milk. The consistency and color of the butter are also elements in judging of the relative merits of churns. The temperature of the air and the milk affect the butter in these respects. During summer, that of the milk should not exceed 62°, and in very hot weather may be under 60°. During cold weather, the milk should be about 2° higher when put into the churn. The speed at which the operation is performed also influences the result. Trials instituted to test the relative merits of churns have failed to settle which is the best form for actual use in the dairy; for the same machine under different conditions does not always yield the same result. The oldest form is the upright or *plunge* churn. There is a general prejudice in favor of this form of C., on the ground that the butter is more completely separated and of better quality. Its great defect is that the operation, being generally performed by hand, is fatiguing. Recent improvements have chiefly aimed at ease in working, and a saving of time. The original *barrel* C., with a rotatory motion, like a grindstone, which motion was reversed every few rounds, has fallen from its once high repute into comparative neglect. An improvement on the barrel C. was the making of the barrel stationary, the milk being agitated by internal apparatus fixed on a horizontal spindle which is turned by a winch handle. Barrel churns, sometimes of monster size, are generally used in large dairies in Holland. For small or moderate-sized dairies, perhaps the most suitable is the *box* C., consisting of a cubical or oblong box, of birch or plane tree, having the agitators fixed on a horizontal spindle. Churns on a centrifugal action have also been successfully used, particularly in Sweden. More recently, churns of a barrel form, with an oscillating motion like a child's cradle, have been introduced, but without any decisively superior results.

To all forms of churns, power other than manual can be and is applied. In some parts of the continent of Europe, and in America, the dog is employed in churning by means of a contrivance like a squirrel's box. Horse-power is in very general use in large dairies in Great Britain. See *illus.*, **THE DAIRY**, vol. IV.

**CHURBUS**. See **HEMP**.

**CHURUBUSCO**, a village 6 m. s. of the city of Mexico, on the river Churubusco, connected with the capital by an elevated paved causeway. In the village is the large convent of San Pablo. In the war between the United States and Mexico, Santa Anna made a stand here, Aug. 20, 1847, but the Americans under Gen. Scott were victorious after a sharp action. On the same day occurred the battle of Contreras, and three weeks after that of Chapultepec, and the capture of the Mexican capital.

**CHUSAN**, an island on the e. coast of China, 40 m. n.e. from Ningpo, in 30° 40' n. lat., and 121° 48' e. long., of an oblong shape, and about 50 m. in circumference. It is mountainous; but has many fertile valleys, with a plentiful supply of water, and is very carefully cultivated by the hardy and independent people by whom it is inhabited. Mr. Fortune was struck with the richness of its flora. Azaleas clothe the mountains; clematises, roses, and honeysuckles grow in great luxuriance. The camphor and tallow tree, and many varieties of bamboo, are found in the valleys. Tea is cultivated to some extent on the hill-sides. For three fourths of the year, the climate is temperate. June, July, and Aug. are the hot months. Pop. about 200,000.

**CHUSAN ISLANDS**, a group of islands scattered round the one described above. The most remarkable of these is the sacred island of Pu-tu, lying e. from Chusan. It is covered with Buddhist temples, pagodas, and monasteries, which latter are inhabited by

a great number of Bonzes, as the Chinese priests are called. The island is devoted exclusively to religious purposes, and no layman is allowed to reside upon it.

**CHUTIA**, or **CHOTÁ, NÁGPUR**, a division of British India under the lieutenant-governor of Bengal, comprising five districts and the seven tributary states, comprising the southwestern frontier agency. It is situated in the southwestern part of Bengal and has an area of 26,966 square miles exclusive of the tributary states and a population in 1891 of 4,629,000, of whom it is estimated that about two-thirds are Hindoos. A large plateau takes up the greater part of the division. The towns are as a rule small, only a few of them having more than 5000 inhabitants. The chief productions are rice, corn, pulse, potatoes, and oil seeds. A little tea is grown in some parts of the division. As to the minerals, there is a considerable quantity of coal and some gold is found. The climate is dry and healthful.

**CHUTIA**, or **CHOTÁ, NÁGPUR TRIBUTARY STATES** (of India), seven in number, viz.: Sirguja, Udaipur, Jashpur, Gangpur, Boná, Koriá, and Chang Bhakár, now under the political superintendence of the commissioner of Chutiá Nagpur, and forming the south-west frontier agency. The states are mountainous, thinly cultivated, and inhabited for the most part by wild aboriginal tribes; area, 16,064 sq. m.; population, in 1891, 883,000. There are no towns, and only three villages of more than 1000 inhabitants.

**CHUT'NEE**, or **CHUT'NY**, an East Indian condiment, very largely used in India, and to a considerable and increasing extent in Great Britain. Indian C. is a compound of mangoes, chillies or capsicum (q.v.), and lime-juice, with some portion of other native fruits, such as tamarinds, etc., the flavor being heightened by garlic. It is sometimes manufactured for sale in England, but not in any quantity. Families occasionally make it for their own use, and employ the following ingredients: Chillies, 1 to 1½ lbs.; apples, 1 lb.; red tamarinds, 2 lbs.; sugar-candy, 1 lb.; fresh ginger-root, 1½ lbs.; garlic, ½ to ¾ lb.; sultana raisins, 1½ lbs.; fine salt, 1 lb.; distilled vinegar, 5 bottles. The chillies are to be soaked for an hour in the vinegar, and the whole ground with a stone and muller to a paste.

**CHWALYNSK'**, a t. of Russia on the Volga; pop., 14,262. It is a river port, and has important manufactures.

**CHYLE**. The food undergoes various changes in the alimentary canal, which will be fully noticed in the article on **DIGESTION**. One of these changes is its conversion in the stomach into a pulpy mass termed *chyme*. The chyme, which passes onward into the small intestine, is acted upon by the bile, pancreatic fluid, and intestinal juice, and through their influences is separated into the *chyle*, which is absorbed or sucked up by the lacteals (q.v.) and into matters unfit for nutrition, which ultimately find their way out of the system by the intestinal canal. The mode in which this nutritious C. is taken up by vessels distributed over the small intestines, and the changes which it undergoes before it is converted into true blood, are described in the articles **LACTEALS**, **THORACIC DUCT**, and **NUTRITION**. We shall here merely notice its leading physical and chemical properties. When obtained from the thoracic duct of an animal that has been killed while the process of digestion was going on (especially if it had taken fatty food), the C. is a white, milky-looking, or yellowish fluid, with a faintly alkaline reaction. Like the blood, it coagulates in about ten minutes after its abstraction from the body of the animal; and in about three hours a small but distinct gelatinous clot is separated from the serous fluid of the chyle.

On examining C. under the microscope, we find that it contains enormous numbers of minute molecules (probably consisting of fat), together with nucleated cells, which are termed the chyle-corpuscles, and are apparently identical with the white or colorless blood-cells. The chemical constituents of C. are much the same as those of blood; fibrin, albumen, fat, extractive matters, and salts being the most important.

**CHYLIFEROUS SYSTEM**. See **LACTEALS** and **THORACIC DUCT**.

**CHYME**. See **CHYLE** and **DIGESTION**.

**CHYTRÆUS**, **DAVID**, 1530-1600; an eminent Lutheran theologian. He studied at Tübingen and Wittenberg, and was a pupil of Melancthon. His learning and talents gave him high position, and he was employed by Maximilian II. to arrange ecclesiastical affairs in Austria. He was principal author of the statutes of Helmstadt, and one of the authors of the *Formula of Concord*. He left a number of important theological works.

**CIALDINI**, **ENRICO**, was b. at Castel Vetro, Modena, Aug. 8, 1811. Designed for the medical profession, he studied at Parma. When the abortive insurrection of 1831 broke out in the duchies, C. joined the volunteers of Reggio; and on the capitulation of Ancona, embarked for France, where he resumed his medical studies. The struggles against absolutism in the Iberian peninsula opened anew the career of arms to the Italian exiles. He joined the legion raised by Dom Pedro in France against the Miguelists, when his great personal courage soon secured his promotion; and the unanimous vote of his comrades pronounced him the worthiest man to receive the order of the tower and sword decreed by the government to his company. After the capitulation of Evora, C. joined (Oct. 22, 1835) the legion of Oporto, formed under Borso di Carminati for ser-

vice in Spain. In this force, C. gained further honors. In 1848, he followed Narvaez in his march against Madrid; was made by him col. of the regiment of St. Ferdinand; and afterwards employed in organizing the civil guard on the model of the French *gendarmérie*. He was in this force when Charles Albert headed the Italian rising in 1848, when he hurried to Italy, and in the struggle which ensued he received a dangerous wound, and fell into the hands of the Austrians. On his release, he was employed by the Sardinian government to reduce to regular discipline the unruly volunteers from the duchies. He succeeded at last, and fought well at the head of his new regiment in the brief campaign of 1849. During the ten years that elapsed from the defeat of Novara to the renewal of the war in 1859, C. was actively employed. In the Crimea, he commanded the third division of the Sardinian contingent; and on his return was appointed inspector-gen. of bersaglieri and aide-de-camp to the king—a rare distinction for a man of plebeian origin. He was intrusted by Cavour with the formation of the famous Cacciatori delle Alpi, placed under the command of Garibaldi after the declaration of war, and co-operated actively with them at the head of the fourth division. The victory at Palestro was his chief exploit, the further progress of the Italians being stopped by the peace of Villafranca. In 1860, he defeated the papal army under gen. Lamoricière, at Castelfidardo. Diplomacy delayed the fall of Gaeta till Feb. 13, 1861, when it yielded to C. after a vigorous bombardment, as did the citadel of Messina shortly afterwards. Turin erected a statue to C. (*vincitore sempre*), and Reggio elected him deputy in April. For a few months he was governor of Naples. He had to act against Garibaldi in the second Sicilian expedition. When the army of Italy was reorganized in 1863, C. was appointed to one of the chief commands. Senator in March, 1864, he signalized himself by his brilliant speech in favor of the transfer of the capital (Dec., 1864). In the war of 1866, the advice of La Marmora was followed, and the defeat of Custoza was the result. C. was appointed chief of the staff on the resignation of La Marmora. In 1867, C. was intrusted by the king with the formation of a new ministry, but failed; he was also made commander-in-chief of the troops in central Italy. In 1870 he was engaged in the annexation of the papal states; and in 1876-79 and 1880-81 he was sent ambassador to France. He d. in 1892.

**CIBA'O**, a range of mountains in the middle of the island of Hayti, about 90 m. long, and having summits more than 7000 feet high. Gold has been found in these mountains.

**CIBBER**, CAIUS GABRIEL, 1680-1700; a sculptor, b. in Holstein, who was engaged to execute the *bass-reliefs* on the pedestal of the London monument, to commemorate the great fire of 1666. He made also the two figures representing "Madness" which once adorned the gate of the old Bethlehem hospital. He built the Danish church in London at his own expense.

**CIBBER**, COLLEY, was b. on the 6th Nov., 1671, in London. He was sent to the free school at Grantham, in Lincolnshire, in 1682. Five years thereafter, he returned to London, and in 1688 was a volunteer in the forces raised by the earl of Devonshire in support of the Prince of Orange. He afterwards conceived a passion for the stage, and after performing gratuitously for several months, he succeeded in obtaining an engagement at 10s. per week, which was raised to 15s.; and on the commendation of Congreve, who had witnessed his performance of lord Touchwood, five additional shillings per week were added. Incited by this magnificent success, he, at the age of 23, married Miss Shore, to the great rage of her father, who revenged himself by spending the greater portion of his fortune in the erection of a retreat on the banks of the Thames. After marriage, C., discovering that 20s. per week was a somewhat insufficient income for an elegant gentleman and an elegant gentleman's wife, was induced to add thereto by the writing of comedies, some of which were remarkably successful. In 1711, he became one of the patentees in the management of Drury Lane, and remained in connection with that theater till 1730; when, on being appointed poet-laureate, he sold his interest in the business. He was, however, sometimes tempted back to the stage by an offer of 50 guineas a night. C. wrote and adapted many plays, but as an author he is best known by his *Apology*. He died suddenly on the 12th Dec., 1757.

**CIBBER**, SUSANNAH MARIA, 1714-66; wife of Theophilus, and daughter-in-law of the dramatist Colley Cibber. Her brother, Dr. Arne, instructed her in music, in which first she appeared publicly; but after her marriage she preferred tragedy. She is the actress of whom Garrick exclaimed on hearing of her death, "Then tragedy has expired with her!"

**CIB'OL**. See ONION.

**CIBORIUM**, a chalice, pyx, or cup, usually of gold or silver, with a cover surmounted by a cross. It is used in the Roman Catholic service to contain the host, or consecrated wafer, in the service of the mass. Ciborium is also the name of a canopy on the altar, supported by four columns, to which the cup, in the shape of a dove, was attached by chains. This especial cup contained the wafer for the communion of the sick. See *illus.*, CEREMONIES, vol. III.

**CIBRA'RIO**, LUIGI, an Italian historian and politician, was b. at Turin, 23d Feb., 1802. He studied at the university of that city, where he took his degree in 1824 as

doctor of laws. Devoted to historical investigations, he secured a reputation in this important department, at a very early period. In 1825 appeared his *Notizie sulla Storia dei Principi di Savoia*; in 1826, his *Notizie di Paolo Simone de Belli*; and in 1827, his *Delle Storie di Chieri Libri IV*. King Charles Albert—with whom he was always a great favorite—frequently employed him in diplomatic service, and in 1848, when Italy rose against the Austrians, appointed C. extraordinary royal commissioner at Venice. During the same year, he was created a senator of the kingdom. When Charles Albert—after the unfortunate issue of the war—went to live in voluntary exile at Oporto, C. was sent by the Sardinian senate to induce him to return. He wrote an account of his unsuccessful mission, entitled *Ricordi d'una Missione in Portogallo al Re Carlo Alberto* (1850). During his public career, however, C. did not neglect his early and favorite pursuits. In 1839, he published his *Della Economia Politica del Medio Evo*; in 1840, his *Storia della Monarchia di Savoia*; in 1844, his *Storia e Descrizione della Badia d'Altomonte*; and in 1847, his *Storia di Torino*. But the new life and energy which Sardinia began to manifest under Victor Emmanuel had its claims on his public usefulness. In 1850, he was appointed superintendent-general of customs, and while occupying this office introduced several important reforms. Subsequently he was intrusted with full powers to negotiate a treaty of commerce with France, in which he distinguished himself notably by his advocacy of the principles of free trade. In 1852, he was made minister of public instruction, and, in 1855, minister of foreign affairs. When Cavour took this department into his own hands, C. became first secretary of the king. In 1857, he was appointed president of the telegraphic congress of Turin. In 1860, C. again made a most successful appearance as an author, in his *Operette Varie* (Torino), and in his *Jacopo Valperga di Masino, Cancelliere di Savoia*. He died at Salò, in the province of Brescia, 1st Oct., 1870.

**CICADA**, a genus of insects of the order *hemiptera*, sub-order *homoptera*, remarkable for the sounds which they emit, the loudness of which is very extraordinary, when considered with reference to the size of the creatures producing them. The largest European species are only about an inch long. The elytræ, or wing-covers, of the cicadæ are almost always transparent and veined. They dwell on shrubs and trees, of which they suck the juices. The male insects alone possess the organs of sound perfectly developed. These are in no way connected with the mouth or throat, but may be described as a musical apparatus on the under side of the abdomen. This apparatus is very complicated, consisting of a set of membranes and fibers connected with powerful muscles. The sound can be produced even after the insect has been long dead, by pulling the fibers, and letting them escape. Cicadas are most common in tropical and warm temperate regions, and are scarcely known in Britain, although one or two species have been found in the s. of England. The ancients regarded the sounds of these insects as types of music and eloquence. In some countries they bear names which signify that sleep is banished by their din. The sounds produced by some of the South American species, which are much larger than the European, are loud enough to be heard at the distance of a mile, and have been likened to the sound of a razor-grinder at work. The Greek name of the C. is *tettix*, often erroneously translated grasshopper. These insects have indeed no resemblance to grasshoppers, and no power of leaping. C. is the Latin name. The modern Italian is *cicale*, the French *cigale*. Byron speaks of the "shrill cicadas." See *illus.*, *INSECTS*, vol. VIII.

**CICATRIZATION** (Lat. *cicatrix*, a scar), the process of healing or skinning over of an ulcer or broken surface in the skin or in a mucous membrane, by which a fibrous material, of a dense resisting character, is substituted for the lost texture. The new tissue, in such a case, is called the cicatrix, and usually resembles, to a considerable extent, the structure which it replaces; it is, however, less elastic, and from its shrinking in volume, sometimes produces an appearance of puckering. The glands and other special structures of the original tissue are wanting in the cicatrix, which, however, performs perfectly well, in most instances, the office of protection to the parts below the surface. See *INFLAMMATION* and *ULCERATION*.

**CICELY**, *Myrrhis*, a genus of umbelliferous plants, nearly allied to chervil, of which one species, sweet C. (*M. odorata*), is common in the central and southern parts of Europe, and in similar climates in Asia, but in Britain is so generally found near human habitations that it appears probably to have been introduced. It is sometimes called *sweet chervil*, and in Scotland, *myrrh*. It is a branching perennial, 2 ft. high or upwards, with large triply pinnate leaves and pinnatifid leaflets, somewhat downy beneath; the fruit remarkable for its large size, and, as well as the whole plant, powerfully fragrant, the smell resembling that of anise. The seeds, roots, and young leaves are used in Germany and other countries in soups, etc. The plant was formerly much in use as a medicinal aromatic.

**CICER.** See *CHICK PEA*.

**CICERO**, MARCUS TULLIUS, the greatest orator of Rome, and one of the most illustrious of her statesmen and men of letters, was b. at Arpinum, on the 8d of Jan., in the year 106 B.C. He belonged to an ancient family, of the equestrian order, and possessed of considerable influence in his native district. His father, himself a man of

culture, and desirous that his son should acquire an eminent position in the state, removed him at an early age to Rome, where, under the direction of the orator Crassus, he was instructed in the language and literature of Greece, and in all the other branches of a polite education. In his sixteenth year he assumed the manly gown, and was introduced to the public life of a Roman citizen. He now acquired a knowledge of law, and underwent a complete course of discipline in oratory. At the same time, he studied philosophy under three successive preceptors, of the Epicurean, Academic, and Stoic schools, and neglected no mental exercise, however arduous, which might conduce to his future eminence; being thus early of the opinion which he afterwards maintained in his treatise *De Oratore*, that an orator should possess almost universal knowledge. With the exception of a brief campaign under Sulla, in the social war, he passed his time in these preliminary studies until his 26th year, when he began to plead in public. In one of his earliest causes, he distinguished himself by defending the rights of Roscius, a private citizen, against one of the favorites of Sulla, who was then dictator. Soon after, for the benefit of his health, and in order to his improvement in elocution, he traveled to the chief seats of learning in Greece and Asia; and, on his return, was regarded as second to no orator at the Roman bar. Having been elected quæstor (76 B.C.), he was appointed by lot to a government in Sicily, a post which he filled with great ability, and to the entire satisfaction of those whom he governed. Some years after his return, he laid the Sicilians under still greater obligations by his successful prosecution of their prætor, Verres, against whom he prepared no less than six orations, although the first had the effect of disheartening the accused so effectually, that he voluntarily retired into exile. Passing, at short intervals, through the offices of ædile (69 B.C.) and prætor (66 B.C.), he was at length elected, by an overwhelming majority, to the consulship. His tenure of office was rendered memorable by the conspiracy of Catiline, which he frustrated with admirable skill and promptitude. See CATILINA. The highest praises were showered upon C.; he was hailed by Cato and Catulus as the "father of his country;" and public thanksgivings in his name were voted to the gods. But his popularity did not last long after the expiry of his consulship. His enemies charged him with a public crime, in having put the conspiring nobles to death without a formal trial, and he found it necessary to leave Rome, and went to reside in Thessalonica (58 B.C.). A formal edict of banishment was pronounced against him, but he was recalled from exile in about 16 months, and on his return to Rome was received with great enthusiasm. His recovered dignity, however, soon excited the envy of the honorable party in the senate, with whom he had desired to make common cause; while Pompey and Cæsar, the greatest powers in the state, and from whose enmity he had most to dread, courted his alliance and co-operation. Thus, while preserving an appearance of independence, he was betrayed into many actions which he could not but regard as ignominious, and which, by increasing the power of the triumvirs, led indirectly to the ruin of the republic. A remarkable exception to this servile conduct is to be found in his assisting Milo when suing for the consulship, and defending him, against the wish of Pompey, and in spite of the hostile feeling of the populace, after he had slain Clodius in an accidental encounter. During this period he composed his works, *De Oratore*, *De Republica*, and *De Legibus*. After a year's admirable administration of the province of Cilicia (61 to 59 B.C.), he returned to Italy on the eve of the civil war. With the convictions which he avowed, there was but one course which it would have been honorable for him to pursue—to enlist himself, at all hazards, on the side of Pompey and the republic. But instead of this he hesitated, balanced the claims of duty and of interest, blamed Pompey for his want of preparation, and criticised the plan of his campaign. At length he joined the army of the senate, but, after the battle of Pharsalia, abruptly quitted his friends, and resolved to throw himself upon the generosity of the conqueror. After nine months' miserable suspense at Brundisium, he was kindly received by Cæsar, whom he followed to Rome. During the years which ensued, he remained in comparative retirement, composing his principal works in philosophy and rhetoric, including those entitled *Orator*; *Hortensius*; *De Finibus*; *Trusculana Disputationes*; *De Natura Deorum*; *De Senectute*; *De Amicitia*; and *De Officiis*. On the death of Cæsar, he was disposed to unite his interests with those of Brutus and the other conspirators, but was restrained by dictates of prudence. In the commotions which followed, he espoused the cause of Octavianus, and gave utterance to his celebrated philippics against Antony. These orations were the occasion of his death. When Octavianus and Lepidus joined with Antony in a triumvirate, C. was among the proscribed; and his life was relentlessly sought. The soldiers of Antony overtook him while his attendants were bearing him, now old, and in an infirm state of health, from his Formian villa to Caieta, where he intended to embark. He met his death with greater fortitude than he had supported many of the untoward incidents of his life. Desiring his attendants to forbear resistance, he stretched forward in the litter, and offered his neck to the sword of his executioners. He died in the 68d year of his age, on the 7th Dec., 43 B.C.

The character of C. is one which it is not difficult to estimate. Really a lover of virtue, no one could follow in her footsteps with greater dignity when attended by the popular applause. But he was weak enough to yield to the depraved spirit of his times, and to act according to his convictions only when they were not evidently discordant with his private interests. Few men, possessing such talents, have been so



utterly devoid of anything approaching to heroism. As a statesman, it would be unjust to deny his legislative abilities; but he was generally deficient in courage and resolution. He was one of the greatest masters of rhetoric that have ever lived. His orations were the result of consummate art, combined with unwearied industry, and survive as characteristic memorials of a time when eloquence, far more than at present, was a power which bent the verdicts of judicial tribunals, and influenced the decrees of the state. In philosophy, he does not rank with the original thinkers of antiquity; nor, in truth, did he aspire to do so. His writings on speculative subjects are chiefly valuable on account of the noble and generous sentiments which they contain, and as reflecting the varied thought of the different schools. The best edition of his correspondence is that of Tyrell and Purser (1886—); of his orations, that of Long (1862); of the philosophy by Schiche (1884), and of the fragments, that of Müller (1879). See the life of Cicero by Forsyth (1864), by Trollope (1880), and Boissier, *Cicéron et ses Amis* (4th ed. 1888).

**CICERO'NÉ** (from Cicero, the orator or speaker), a guide, usually for the purpose of showing the curiosities and works of art in a town to strangers. Cicerónés are of all degrees, from distinguished archæologists, who undertake the office as a favor, to the humble *laquais de place*, who, though quite indispensable on a first arrival, is too often both incompetent and dishonest.

**CICHO'RUM.** See CHICORY and ENDIVE.

**CICINDELA**, a genus of insects of the order *coleoptera*, section *pentamera*, the type of a large family, *cicindelida*. This family is nearly allied to *carabida*, and the insects belonging to it are among the most voracious of those beetles which, both in their perfect and larva state, prey on other insects. They have a strong head, with projecting toothed mandibles, and are particularly distinguished by a sort of hook or nail, which is articulated by its base to each of the lower jaws or maxillæ. They are more abundant in tropical than in cold countries; a few species, none of them large, are found in Britain. The head of the larva is large, concave above, and the back furnished with two remarkable hooked spines, which are said to be used as anchors to fix it at any part it chooses of its burrow in the earth; whilst the soil which it excavates is carried to the mouth of the burrow in a sort of natural basket formed of the concave back of the head and the recurved mandibles. The larva lies in wait in its burrow, its head just level with the ground, till its prey comes within reach, upon which it suddenly rushes. — *C. campestris*, a green species with whitish spots, is common in most parts of Britain.

**CICISBE'O** is the name given in Italy to the professed gallant or constant attendant upon a married lady. In the higher ranks of Italian society, it was at one time considered unfashionable for the husband to associate with his wife anywhere except in his own house. In society, or at public places of amusement, the wife was accompanied by her C., who attended at her toilet to receive her commands for the day. This custom, which was once universal, and which naturally gave rise to much scandal, has now almost disappeared. C. is synonymous with *cavaliers servants*.

**CICOGNA'RA**, LEOPOLDO, Count da, 1767–1834; an archæologist and art-critic of Ferrara. He visited all the noted cities of southern Europe, studying them with the eye of an archæologist and connoisseur. Napoleon found him engaged in politics and a member of the legislative body of Modena. In 1808, C. was made president of the Academy of Fine Arts in Venice. In 1818–18 he produced his great work on the history of art, designed to complete the labors of Winckelmann and d'Agincourt.

**CICO'NIA.** See STORK.

**CICU'TA.** See HEMLOCK.

**CID'ARIS**, a genus of *echinida* (q. v.), or sea-urchins, closely allied to the genus *echinus* itself, and included along with it in a family or tribe called *cidarites*, in which the mouth and anus are opposite to each other—the mouth below, and the anus above. Only one species, *C. papillata*, has been found in the British seas, and that only on the coasts of Zetland. The Zetlanders call it the *piper*, from a resemblance which they trace in its globe and spines to a bagpipe. They say that it is sometimes found with spines a foot long. The markings of the shell and spine, are extremely beautiful. See *illus.*, COURTE GROUP, vol. X.

**CID CAMPEADOR** is the name given in histories, traditions, and songs to the most celebrated of Spain's national heroes. There is so much of the mythical in the history of this personage, that hypercritical writers, such as Masdea, have doubted his existence; but recent researches, more particularly those of Dozy, and the investigation of newly discovered Arabic sources, have succeeded in separating the historical from the romantic. See Dozy's *Recherches sur l'Histoire Politique et Littéraire de l'Espagne pendant le moyen âge* (Leyden, 1849). The following is the result of these inquiries: Roderigo Ruy Diaz (Roderic the son of Diego) was descended from one of the proudest families of Castile. His name first appears in a document written in 1064, during the reign of Ferdinand of Leon. Under Sancho II., son of Ferdinand, he became standard-bearer and commander of the royal troops. In a war between the two brothers, Sancho

II. and Alfonso VI. of Leon, it was a stratagem of Roderic's—which, according to modern notions, was anything but honorable—that secured the victory of Sancho at Llantada (1068) over his brother, who was forced to seek refuge with the Moorish king of Toledo. He appears at this time to have already been called the *campeador*, a word supposed to answer to our champion.

Upon the assassination of his friend and patron, king Sancho, he required the next heir, don Alonzo, to clear himself by oath of any participation in his brother's murder, ere the nobles of Leon and Castile should do homage to him. By this act, he incurred the new monarch's enmity; an enmity which, however, the king's policy concealed in the hour of danger, and he even consented to Roderic's marriage with his cousin Ximena—daughter of Diego, duke of Asturia. But when the king thought the services of Roderic no longer necessary to his own safety, he lent a willing ear to the latter's personal enemies, and banished him in 1081. Roderic then joined the Moorish kings of Saragossa, in whose service he fought against both Moslems and Christians. It was probably during this exile that he was first called the Cid or Sid, an Arabic title which means lord. He frequently defeated the king of Aragon and the count of Barcelona, the latter of whom, Berenguer Ramon II., he took prisoner.

He was again reconciled to the king, but only for a short time, when he was condemned to a second exile. In order to support his family and numerous followers, he now saw himself forced to carry his sword against the Moors, over whom he gained a victory, and established himself as sovereign or lord of Valencia (1094). He retained possession of Valencia five years, during which time he took many neighboring fortresses. He died of grief in 1099, on learning that his relative and comrade in arms, Alvar Fañez, had been vanquished by the Moors, and that the army which he had sent to his assistance had been defeated near Alcira. After the Cid's death, his widow held Valencia till 1103, when she was obliged to capitulate to the Almoravides, and fly to Castile, where she died in 1104. Her remains were placed by those of her lord in the monastery of San Pedro de Cadefia. The Cid had a son, who was slain by the Moors in a battle near Consuegra. He also left behind him two daughters, one of whom was married to the count of Barcelona; the other to an infant of Navarre, through whom the kings of Spain and many royal houses of Europe claim kindred with "*Mio Cid el Campeador*." Relics of the "Blessed Cid," as he is still called in Spain, such as his sword, shield, banner, and drinking-cup, are still held in great reverence by the populace. The numerous *Cid romances* that were first published in the 16th c., contain the most romantic improbabilities concerning the life and deeds of the Cid. See *Silen de Varios Romances* (1550), and *Romancero General* (1604). These romances were taken from the ancient *cantares* (national songs) and *poemas*, most of which are entirely lost. The most important of modern works on this subject, besides that of Dozy above mentioned, are Huber's *Geschichte des Cid*, etc. (Bremen, 1829), and Southey's fascinating *Chronicle of the Cid* (Lond. 1808). The former of these is, however, the more valuable in a historical point of view. See also Willemaers, *Le Cid* (Bruss. 1873).

**CIDER** is the fermented juice of apples, and is extensively prepared in Gloucestershire and other parts of England, in Ireland, in the northern districts of France, and in North America. In Normandy, a vast number of varieties of acid or bitter-apples are grown for the preparation of cider. The apples are first bruised in a circular stone-trough or *chase*, by a similarly shaped stone or *runner*, which revolves by machinery in the interior of the trough. The pulp so obtained is placed in sieve-bags made of hair-cloth or reed-straw, and subjected to pressure, which yields a dark-colored, sweet liquid, and leaves in the bag a somewhat dry residue, consisting of the pips, skin, and other fibrous parts of the apple. The apple-juice passes first into a shallow tub or *trin*, and is almost immediately placed in casks in a cool place, when fermentation begins, part of the sugar is converted into alcohol, and in a few days, a clear liquid is obtained, which can easily be racked off from sedimentary matter. C. is largely used in America as a beverage, and is very palatable and refreshing. It contains from  $5\frac{1}{2}$  to 9 per cent. of alcohol, and is therefore intoxicating when drunk in quantity. It does not possess the tonic and nourishing properties, however, of bitter beer. C. quickly turns sour, becoming *hard* C., owing to the development of lactic acid. See **APPLE-JACK**.

**CIENFUEGOS**, a city in Cuba, on the s. coast of the island, on the bay of Jagua, 120 m. s.e. of Havana; pop. '92, 27,430. It has a good harbor, and is one of the best built cities in the island. Railroads give communication with Cardenas and other towns on the n. coast. C. was founded in 1813 by a captain-general of that name.

**CIGARETTE**, is a roll of tobacco enclosed in thin paper. The manufacture is comparatively new in the U. S., as the extensive use of the article is recent here, though long in vogue in some southern countries. The leaves of the tobacco are first stripped, during which process atomizers are used to keep the tobacco at a proper temperature, and to destroy impurities. The leaves are then pressed and mixed in various proportions, according to the brand desired; after which the tobacco is rolled in paper wrappers, usually 8 in. long, 1 in. wide, and pasted with starch. Hydrometers are used in the packing room to denote the proper degree of humidity. The best wrappers are made in Switzerland, of thin rice straw. C. smoking is pronounced by physicians to be productive of injury to the heart, especially when the smoke is inhaled. For this reason some states have enacted laws forbidding the sale or presentation of cigarettes to children under fifteen years of age. See **TOBACCO**.

**CIGARA.** See TOBACCO.

**CIGOLI, LUDOVICO CARDI DA**, an architect and painter of the later Florentine school, which, about the end of the 16th c., developed, in opposition to the languid mannerists of the time, a peculiar *eclectic* style of art. C. was b. at Empoli in 1559. His model was Correggio; but as the latter was deficient in design, and in the scientific knowledge of perspective, C. endeavored to unite these with the warm bright coloring and wonderful chiar-oscuro of Correggio. He was invited by Clement VII. to Rome, where he died in 1613. Among C.'s most famous pictures may be mentioned—"The Healing of the Lame Man" (St. Peter's, Rome), "The Martyrdom of St. Stephen" (Uffizi Gallery, Florence), "Tobias in the Act of Thanking the Angel" (St. Petersburg), and "St. Francis," a favorite subject with C. (Pitti Palace, Florence).

**CIL'IA**, (Lat. eyelashes), a term variously employed in botany and zoology to designate fringing hairs or hair-like processes. Thus, the margins or nerves of leaves, petals, etc., are often described as *ciliated* or furnished with cilia. The fine thread-like processes which surround the opening of the fruit of many mosses, are called C.; but these processes, when broader, are denominated teeth. See EPITHELIUM.

**CILICIA**, an ancient division of Asia Minor, now included in the Turkish eyalet of Koniah. The Taurus range, which separated it from Cappadocia, bounded it on the n., the gulf of Issus and the Cilician sea on the s., while the Amanus and Pamphylia bounded it respectively on the e. and west. Lat. 36° to 38° n., long. 32° 10' to 37° 8' e. The eastern portion of C. was fertile in grain, wine, etc.; while the western and more mountainous portion furnished inexhaustible supplies of timber to the ancients. The pass called by the Turks Gölek Bógház is that by which the younger Cyrus passed from Tyana in Cappadocia to Tarsus; and it is also the same by which Alexander the Great entered Cilicia.

In early ages, C. was ruled by its own kings, the dynasty of Syennesis being apparently the most important. The Cilicians were a distinct people in the time of Xenophon; but the Greeks appear to have got a footing after the time of Alexander. The Cilicians were notorious pirates, but having carried on their depredations too close to the shores of Italy, the Roman arms were turned against them, and C. was made a Roman province in Pompey's time.

**CIMABUÉ, GIOVANNI**, one of the restorers of the art of painting in Italy, which had fallen into neglect during the barbarism of the dark ages, was b. at Florence in 1240. At this time, the fine arts were practiced in Italy chiefly by Byzantines, and had degenerated into a worn-out mechanical conventionalism. C. at first studied under Byzantine masters, and adopted their traditional forms, but gradually excelled his teachers, made innovations on the fixed patterns set before him, and gave life and individuality to his works. Two remarkable pictures of the Madonna by C. are still preserved in Florence—one (chiefly Byzantine in style) in the academy; the other, displaying a more purely original genius, in the church of Santa Maria Novella. It is said that this latter work in the time of C. was admired as a miracle of art, and was carried to the church in a sort of triumphal procession. More remarkable pictures in point of expression or dramatic effect, are found in C.'s frescoes in the church of San Francisco at Assisi. C. died soon after 1300. What strikes one as very wonderful about C.'s pictures, is the accuracy of his naked figures, considering that he had no better professional guides than the Byzantine artists. His draperies were also very good, but he had apparently no knowledge of perspective, though acquainted with architecture. His greatest pupil was Giotto (q.v.).

**CIMAROSA, DOMENICO**, an Italian composer of operas, was b. at Naples in 1749, and was educated in music under Sacchini, and in the conservatory of Loretto. His first pieces were the *Sacrificio di Abramo* and the *Olympiade*. When barely 22, he had achieved a reputation in all the leading Italian theaters. He was then called to St. Petersburg, where he resided four years. Afterwards, he lived at various German courts; thence he proceeded to Vienna, where he became imperial chapel-master; and finally, he returned to Italy. At Naples, his comic opera, *Il Matrimonio Segreto*, composed at Vienna, 1791, was repeated 57 times in succession. C. died at Venice in 1801.

**CIMBALO**, a musical instrument with a set of keys like the clavessin or harpsichord.

**CIM'BRI, or KIM'BRI**, a people who issued from the n. of Germany in conjunction with the Teutones, and first came into hostile contact with the Romans in the eastern Alps in 113 B.C. They were victorious in several great engagements, and were only prevented from devastating Italy by sustaining a terrible defeat from Marius, on the Raudii Campi, near Verona, or, according to others, near Vercelli, in Aug., 101 B.C. Their infantry fought with their shields fastened together by long chains; their horsemen, of whom they had 15,000, were well armed with helmet, coat of mail, shield, and spear. Marius had so chosen his position that the sun and dust were in their faces, and yet they contested the victory most bravely with the Romans, who were 55,000 strong. When the battle was lost, the women, who remained in the camp formed of the wagons, killed themselves and their children. 140,000 C. are said to have fallen in the battle;

the number of prisoners is given at 60,000. It is not till long afterwards, when the Romans themselves penetrated into Germany, that the name of the C. again appears. Cæsar represents the Aduatici of Belgium as the descendants of the C. and the Teutones. Tacitus speaks of a people, bearing the name of C., few in number, but of great reputation, that sent ambassadors to Augustus. This people lived in the extreme n. of Germany, on the borders of the ocean; according to Pliny and Ptolemy, at the extremity of the peninsula called from them the Cimbric Chersonese, now Jütland. The ethnology of the C. is doubtful. Greek writers associated them groundlessly with the Cimmerians (q.v.); Sallust calls them Gauls; Cæsar, Tacitus, and Plutarch looked upon them as Germans, and the opinion of their German origin has been adopted by most moderns. Yet H. Müller, in his *Marken des Vaterlands* (1837), has endeavored to show that they belonged to the Celtic race, and lived originally on the n.e. of the Belgæ, of kindred origin; and that their name is the same as that by which the Celts of Wales designate themselves to this day—*Cymri*.

**CIMEX** and **CIMICIDÆ**. See BUG.

**CIMICIFUGA**, or BUGBANE, an herb of the order *ranunculacea*. It is the black snake-root found in all the northern states, and much used in rural districts as a medicine, chiefly in the form of a decoction. It is believed to be useful in nervous diseases, rheumatism, and bronchitis.

**CIMIN'NA**, a t. of Sicily, in the province of Palermo, 18 m. s.e. of the city of that name. Population, 5000.

**CIMMERIANS**, or **CIMMERII**, in the poems of Homer, the name of the people dwelling "beyond the ocean-stream," where the sun never shines, and perpetual darkness reigns.—But the historic C. were a people whose country lay between the Borysthenes (Dnieper) and the Tanais (Don), including also the Tauric Chersonesus (Crimea). The Cimmerian Bosphorus (strait of Yenikale) derived its name from them. Being driven out by the Scythians, they migrated to Asia Minor, dwelt there for some time, plundered Sardis, failed in an attempt upon Miletum, and were finally routed and expelled by the Lydian king Alyattes, some time after 617 B.C.

**CIM'OLITE**. See FULLERS' EARTH.

**CIMON**, an Athenian commander, was the son of Miltiades, the conqueror at Marathon. In conjunction with Aristides, he was placed over the Athenian contingent to the allied fleet, which, under the supreme command of the Spartan Pausanias, continued the war against the Persians (477 B.C.). He effected the important conquest of Eion, a town on the river Strymon, then garrisoned by the Persians. Later (according to Clinton, 466 B.C.), when commander-in-chief, he encountered a Persian fleet of 350 ships at the river Eurymedon, destroyed or captured 200, and defeated the land-forces on the same day. He succeeded likewise in driving the Persians from Thrace, Caria, and Lycia; and expended much of the money which he had obtained by the recovery of his patrimony in Thrace upon the improvement of the city of Athens. At this period he appears to have been the most influential of the Athenians. The hereditary enemy of Persia, it was his policy to advocate a close alliance with Sparta; and when the Helots revolted, he led an army upon two occasions to the support of the Spartan troops; but on the latter occasion, having lost the confidence of his allies, he was ignominiously dismissed. After his return to Athens, his policy was opposed by the democracy, headed by Pericles, who procured his banishment by ostracism. He was recalled in the fifth year of his exile, and was instrumental in obtaining a five years' armistice between the Spartans and the Athenians. He died in the year 449 B.C., while besieging the Persian garrison of Citium, in Cyprus.

**CINALO'A**, a t. of Mexico, in the state of the same name, on the Rio Cinaloa, about 50 m. from its entrance into the gulf of California. It was at one time a thriving place, with a population of 10,000, but has since been reduced to about 3000.

**CINALOA**. See SINALOA.

**CINCHO'NA**, a most important genus of trees of the natural order *cinchonacea*; yielding the bark so much valued in medicine, known as Peruvian bark, Jesuits' bark, China bark, quina, quinquina, cinchona bark, etc., and from which the important alkaloids *quina* or *quinine* (q.v.), and *cinchonina* or *cinchonine*, are obtained. The species of this genus are sometimes trees of great magnitude; but an after growth springing from their roots when they have been felled, they often appear only as large shrubs; and some of them in the highest mountain-regions in which they are found, are low trees with stems only eight or ten feet in height. They exist only in South America, between s. lat. 20° and n. lat. 10°, and chiefly on the eastern slope of the second range of the Cordilleras. All the cinchonas are evergreen-trees; with laurel-like, entire, opposite leaves; stipules which soon fall off; and panicles of flowers, which, in general appearance, are not unlike those of lilac or privet. The flowers are white, rose-colored, or purplish, and very fragrant. The calyx is small and 5-toothed; the corolla tubular with a salver-shaped 5-cleft limb. In the true *cinchonas*, the capsule splits from the base upwards; the species in which it splits from above downwards form the sub-genus *cascarilla*; the

distinction acquiring importance from the consideration, that the barks of the former alone contain the alkaloids so valuable in medicine; and this property is further limited to those species which have the corolla downy or silky on the outside. Beyond the botanical limits thus narrowly marked out, not a trace of these alkaloids has yet been discovered anywhere.

Great difficulty has been found in determining the species by which the different varieties of *C. bark* known in commerce are produced. The common commercial names are derived partly from the color of the kinds, and partly from the districts in which they are produced, or the ports where they are shipped. It appears, however, to be now ascertained that *calisaya bark*, also called royal or genuine yellow bark, one of the very best kinds—mostly shipped from Arica—is chiefly the produce of *C. calisaya*, a large tree, growing in hot mountain valleys of Bolivia and the south of Peru. To give all the varieties of bark and species of tree would go beyond our limits.

The accurate discrimination of the different kinds of bark requires much experience. The taste is always bitter; but it is possible even to distinguish by the taste those varieties which contain quinia most largely from those in which cinchona is most abundant.

The cutting and peeling of *C. trees* are carried on by Indians, who go in parties, and pursue their occupation during the whole of the dry season. They build a hut, which serves both for their abode and for drying the bark. The trees are felled as near the root as possible, that none of the bark may be lost; and the bark being stripped off, is carefully dried; the quilled form of the thinner bark is acquired in drying. The bark is made up into packages of various size, but averaging about 160 lbs. weight, closely wrapped in woolen cloth, and afterwards in hides, to be conveyed on mules' backs to the towns. These packages are called drums or *seroons*. It is in them that the bark is always brought to Europe.

A number of spurious kinds of Peruvian or *C. bark* are either sent into the market separately, or are employed for adulterating the genuine kinds. They are bitter barks, and have, in greater or less degree, febrifugal properties, but are chemically and medicinally very different from true *C. bark*. They are produced by trees of genera very closely allied to cinchona.

Whilst *C. trees* have been becoming every year more scarce in their native regions, no attempt has been made to cultivate them there, notwithstanding the constantly increasing demand for the bark; but the Dutch have recently made extensive plantations of them in Java; and the same has been done in British India, from seeds and plants obtained from the South American governments, by Mr. Markham. In the course of his researches in South America, Mr. Markham found only one *C. tree* planted by human hands. See PERUVIAN BARK.

The Indians of Peru call the *C. trees* *kina*, from whence are derived the names *china*, *quina*, etc. But it is not certain that they knew the use of the bark before the arrival of the Spaniards. It is a medicine of great value in the cure of intermittent fevers (see AGUE), and diseases attended with much febrile debility; also in certain forms of neuralgia (q.v.), and other diseases of the nervous system. It seems to have been first imported into Europe in 1639, by the countess Del Cinchon or Chinchon, the wife of the viceroy of Peru, who had been cured of an obstinate intermittent fever by means of it, and upon this account it was named *C. bark* and *countess's powder* (*pulvis comitissæ*). The Jesuit missionaries afterwards carried it to Rome, and distributed it through their several stations, and thus is acquired the name of *Jesuit's bark* and *powder of the fathers* (*pulvis patrum*). Cardinal Juan de Lugo having been particularly active in recommending and distributing it, it was also known as *Cardinal de Lugo's powder*. It attained great celebrity in Spain and Italy, being sold at high prices by the Jesuits, by whom it was lauded as an infallible remedy, while by most of the orthodox physicians it was coldly received, and by the Protestants altogether repudiated. Its mode of action not being well understood, and the cases to which it was applicable not well defined, it seems, in the first instance, to have been employed without due discrimination, and to have fallen very much into the hands of empirics. Falling, however, into disuse in Europe, it was again brought into notice by sir Robert Talbor or Talbot, an Englishman, who brought it to England in 1671, and acquired great celebrity through the cure of intermittents by means of it, and from whom Louis XIV. purchased his secret in 1682. A pound of bark at that time cost 100 louis-d'or. Talbor seems to have been a vain and self-seeking man, but who had, nevertheless, the acuteness to discern and systematically to avail himself of the healing virtues of the neglected Jesuits' bark, which he mixed with other substances, so as to conceal its taste and odor. Soon afterwards, both Morton and Sydenham, the most celebrated English physicians of the age, adopted the new remedy; and its use, from this period, gradually extended, both in England and France, notwithstanding the opposition of the faculty of medicine in the latter country. As it came into general use, it became a most important article of export from Peru; but for a long time, the value of the bark to be procured in New Granada remained unknown; and in order to the maintenance of a commercial monopoly, extraordinary methods were even employed to prevent it from becoming known at a comparatively recent period of Spanish rule in America. The discovery of the alkaloids on which its properties chiefly depend, constitutes a new era in the history of this medicine, and did not take place till the beginning of the present century.

The chief active principles are the two alkaloids, quinine (q.v.) and cinchonine. The latter is not generally present in so large a proportion as the quinine, and does not possess such powerful medicinal properties. When isolated, the alkaloid *cinchonina*, or cinchonine, has the formula  $C_{15}H_{20}N_2O$ , and can be obtained in a crystallized state.

C. bark itself has, in later times, fallen into comparative disuse, owing to the discovery of the alkaloid quinine, which is now extensively in use in medicine in the form of sulphate or disulphate of quinine, and is given in doses of from one to twenty grains, in almost all the cases to which the bark was supposed to be applicable.

**CINCHONA'CEÆ**, a natural order of exogenous plants, consisting of trees, shrubs, and herbaceous plants, with simple, entire, opposite, or whorled leaves, and stipules between their foot-stalks. The calyx is adherent to the ovary; the corolla is tubular and regular, its segments are equal in number to those of the calyx, when the calyx is divided; the stamens arise from the corolla, and are alternate with its segments. The ovary is surrounded by a disk, and usually two-celled; the style single, the fruit either splitting into two halves or not splitting at all, either dry or succulent.—This order has been very generally regarded by botanists as a sub-order of *rubaceæ* (q.v.), but far exceeds all the rest of that order, both in the number and importance of its species, of which from 2,500 to 3,000 are known, mostly tropical, and the remainder, with few exceptions, subtropical. The C. are nearly allied to *caprifoliaceæ* (woodbines or honeysuckles, etc.), (q.v.).

**CINCINNATI**, capital of Hamilton County, Ohio, chief city in the state, and ninth in the United States in population, is on the right bank of the Ohio River, in latitude  $39^{\circ} 6' 30''$  north, and longitude  $84^{\circ} 28'$  west, and is the geographical centre of a valley 200 miles in extent, one of the most fertile in the world. It lies midway between Pittsburgh and Cairo, 116 miles southwest of Columbus, 270 miles southeast of Chicago, 340 miles northeast of St. Louis, 764 miles from New York, 610 miles from Washington, and 2100 miles from New Orleans.

As early as 1780 land was purchased at this point from the United States Government by John Cleves Symmes, and two block-houses were erected here. The settlement received the name of Losantiville, meaning "the town opposite the mouth of the Licking." Another city was projected by the same person at the junction of the Ohio and Great Miami Rivers, but this was destroyed by floods, and the Government deciding to build Fort Washington at Losantiville, on Mill Creek, it thus made Cincinnati the central point. Gen. St. Clair made it the county seat, but for some years it was only a village of log cabins. Settlers began to arrive from New Jersey, and it soon attracted emigrants from New England and the South. It received its present name from Gen. St. Clair, in honor of the Society of the Cincinnati (q.v.). It was incorporated in 1802, but its progress was slow until steam navigation was introduced, in 1816. On the completion of the Little Miami Railroad, in 1840, immigration increased, and a large number of Germans settled there. In 1802 a Young Ladies' School was opened, and in 1814 the Cincinnati College and Lancaster Academy were founded. Cincinnati's nearness to the slave states, and its social and commercial relations with their citizens, led to the opposition of anti slavery measures, and even the discussion of slavery was dangerous. Two or three times a press established by James G. Birney was destroyed by a mob, with the excuse that the city's trade with the South could not be retained if an anti-slavery paper were tolerated. The city was a rendezvous for fugitive slaves on their flight to Canada, and no less than 3000 were harbored by Levi Coffin, a quaker citizen. In 1863 it became necessary to place the city under martial law, when an attack by a Confederate force was expected, so large a proportion of the citizens was in sympathy with the South. In 1864, March 28th–31st, a riot occurred, and an armed mob broke into the jail to lynch some murderers who had escaped the full penalty of their crime; on being frustrated they burned the Court-House and other buildings. The state militia was called out, and forty-five persons were killed and 188 wounded before order could be restored.

The "Queen City of the West" is built upon two plateaux 400 to 500 feet above the level of the sea. It is nearly surrounded by hills forming a semicircle, which approach close to the river above and below the enclosed plain, the ends of the semicircle being only two miles and a half apart. The first plateau is sixty-five feet above low-water mark, and rises on the north side 400 feet above the Ohio River, which forms here a grand curve from east to west; and the second is elevated fifty to 100 feet higher, some points reaching an elevation of 900 feet above the sea-level. These highlands are pierced by ravines, which gives a most picturesque effect to the city, and are covered with the beautiful residences of opulent citizens. The streets and avenues average 66 feet in width, crossing each other at right angles in the old portion and conforming to the surface conditions in the new. The summits of the hills, which have been made accessible, command highly interesting views of the rolling country surrounding the city. Of the three terraces by which the ascent is made, the lowest, or "bottom," streets are mainly given up to manufacturing and wholesale trade. The city covers an area of 37 sq. m., having annexed several suburban villages. The brick and free-stone found near at hand and the blue limestone quarried within the city limits are largely used for building materials. The average temperature in summer is  $75.24^{\circ}$ ; in winter,  $34.28^{\circ}$ ; the yearly mean being  $54.72^{\circ}$ .

Cincinnati has several fine parks, well wooded and picturesque. The famous Eden Park, or "Garden of Eden," has 216 acres enclosed, with fine views of the city, and contains the Art Museum which cost over \$350,000. Burnet Woods, another delightful park, contains 170 acres. There are twenty-six cemeteries; Spring Grove, the most celebrated, has 600 acres of land, lies six miles from the city, and is approached by an avenue 100 feet wide. Among its costly monuments are the Dexter Mausoleum and a bronze statue commemorating the soldiers who died in the Civil War. Beautiful suburban villages cluster about, to which miles of street railroads give access. Roads and bridges connect with Newport and Covington, Ky., on the opposite side of the river. Ludlow, Bellevue, Linwood, Mt. Lookout, Oakley, and Riverside are some of the near-by towns filled with large and costly dwellings set in extensive grounds. "Over the Rhine" is the designation of that part of the city between the canal and the hills; it is inhabited almost exclusively by Germans, and is famous for its concert and beer gardens. The largest (wire suspension) bridge across the Ohio was designed by J. A. Roebling, and completed in 1867 at a cost of \$1,800,000. It is 2252 feet long and 106 feet above low-water mark. Another bridge of wrought iron resting upon stone piers connects Cincinnati with Newport, Ky. A third bridge connects the city with Ludlow, Ky.; the bridge of the Chesapeake and Ohio railroad cost \$3,348,675, and has the longest truss-span in the world; and a fifth bridge is a cantilever. There are more than twenty street-railroad lines, some of which are inclined planes and some electric and cable.

The central and business portions of the city are compactly built, almost the entire valley being filled up. As the terraces rise, one above another, the streets become more irregular and the buildings with extensive grounds, are spread out with a more picturesque effect than in any other city. A fine public landing or levee extends along Front Street, the shore being well paved, and with floating docks and wharf boats.

The United States Government Building, containing the Post Office, Custom House, Court Rooms, and various offices, was erected at a cost of \$5,000,000. It is of sawed freestone, three stories high, in the Roman-Corinthian style. The Custom House is equally fine and much larger. The County Court House, with the Jail, occupies a whole square; it is three stories high, built in the Romanesque style, and nearly fire-proof. The City Hospital, consisting of eight distinct buildings arranged around a central court, occupies a square of nearly four acres. It cost over \$700,000, exclusive of the ground, which is worth \$800,000 more. It will accommodate 700 patients. Masonic Temple and Odd Fellows' Hall are grand buildings. The Chamber of Commerce is another elegant building, and the City Hall cost \$1,500,000. The City Workhouse has cells for 700 prisoners, with workshops and grounds for their employment. Longview Asylum for the Insane, at Carthage, ten miles from the city, is of brick in the Italian style, four stories in height. St. Peter's Roman Catholic Cathedral is an immense structure in pure Grecian architecture, with a stone spire 224 feet high. St. Paul's Methodist Episcopal Church, the First and Second Presbyterian Churches, St. John's Protestant Episcopal, and the Jewish Synagogue are all worthy of note. The First Presbyterian has the loftiest spire in the West, 285 feet high.

Among the buildings devoted to amusement, Pike's Opera House is justly celebrated. The Springer Music Hall, used also as an exposition building, is 500 by 300 feet, and contains the largest organ in the United States. The hall seats 5400 persons, and with the organ cost \$1,000,000. The Grand Opera House, Havlin's Theatre, College Hall, Greenwood Hall, the Lyceum, Arbeiter Hall, Turner Hall, Heuck's Opera House, and Robinson's Theatre are also elegant structures. Owing to the large number of German residents, this city has become noted for its musical societies, and it is fast becoming the centre of social culture, literature, and the fine arts in that section of the country. Cincinnati is the seat of a Roman Catholic archbishop.

The educational advantages of this city are unsurpassed, with several high schools, many public schools and intermediate schools, and thousands of pupils, employing hundreds of teachers. The higher institutions include a Normal school; the University of Cincinnati, an outgrowth of McMicken University, which has an astronomical department with an observatory at Mt. Lookout, and new collegiate buildings in Burnet Woods park; Wesleyan Female College; Hebrew Union College; St. Joseph's and St. Xavier's Jesuit colleges; several medical, musical, and commercial colleges; Lane theological seminary at Walnut Hills, colleges of law, pharmacy, and dentistry, the Franklin school, Cincinnati art academy, and the Hughes and Woodward high schools.

The Ohio Mechanics' Institute is a strong factor in the education of the masses. It has many pupils who attend the day and night schools, where they are instructed in literature, science, and mathematics, and have the advantage of a large library, lectures, etc. The principal museum, situated in Eden Park, was founded by the ladies of Cincinnati. It is a large building, modelled in its construction and in the system of instruction given in its art school after the South Kensington Museum of England. It has many fine paintings, statues, and works of art, and hundreds of students. The most noted public piece of ornamentation is the Tyler-Davidson fountain, on Fountain Square, Fifth Street, which was cast at the Royal Foundry in Munich, and cost \$200,000. The Garfield Statue at Eighth and Race Streets is a work of merit.

There are many libraries, including the Public, the Young Men's Mercantile, Law, the Historical, and the Mechanics'. This city has a Zoological Garden containing sixty acres of hills, valleys, and ravines well stocked with wild animals of all kinds.

Cincinnati had (in 1890) 7832 manufacturing establishments, which gave employment to 96,689 workmen, paying them in wages \$47,691,332; total receipts, \$196,063,963. Among the leading industries are men's factory clothing, valued in 1890 at \$17,951,525; distilled liquors, \$11,471,673; malt liquors, \$7,454,417; foundry and machine-shop products, \$10,090,564; carriages and wagons, \$3,669,312; boots and shoes, \$6,024,454; furniture, \$4,208,974; tobacco and cigars, \$3,288,453; soaps and candles, \$3,826,480; and slaughtering, \$2,607,885. Besides these are manufactured largely iron and steel forgings, trunks, valises, all kinds of tanned and curried leather goods, wire-work, scales and balances, brick and tile, carriages and buggies, bridges, cutlery, hosiery and cotton goods, cars, cheese and butter, brooms, brushes, wood-turning products, etc. The Rockwood Pottery produces purely American wares of high artistic merit, which are extensively known.

The police force is efficient and well conducted, the outlying wards being protected by mounted patrol. The military organizations are the First Regiment of Infantry, a Battery and the First Regiment of Artillery, O. N. G. The fire department is well supplied with steam and chemical engines, hook and ladder trucks, hose carriages, men and horses. Water is pumped from the Ohio into reservoirs in Eden Park, from which are supplied cisterns, mains, and hydrants.

The city government is conducted upon the federal plan. The Mayor appoints his own Board of Administration, the members of which have charge of improvements and repairs; a Board of Park Commissioners; Board of Review; Board of Election, and the Prosecutor of the Police Court. He is the Chief of Police, with all the powers of an officer of the army. The Board of Police Commissioners is appointed by the Governor.

The commanding position of Cincinnati brings the city into admirable commercial relations with the Mississippi and Ohio valleys. The amphitheatre of hills opens for the spacious Mill Creek, half a mile in width at the narrowest part, and through this and the narrow river valley passes and repasses the vast fleet of steamboats and barges that conveys the treasures of coal and iron and lumber from the Alleghanies, and the produce of the South to the shores of the Queen City. The commerce by water is very large. The Cincinnati, Portsmouth, Big Sandy, and Pomeroy, and Memphis and Cincinnati Packet Companies, and the United States Mail Company control much of the trade of the 1000 miles of the Ohio and 200 miles of tributary streams. The Southern Transportation Lines conduct the business with New Orleans.

Population in 1810, 2540; 1850, 115,435; 1870, 216,239; 1880, 255,139; 1890, 296,908.

**CINCINNATI, SOCIETY OF THE**, a society or order in the U. S. established in June, 1783, by the officers of the revolutionary army at their cantonment near Newburg, N. Y. Its object was to perpetuate the friendships formed during the contest recently ended, to keep alive the patriotism of its members, and to provide for the needy among their number. The name chosen was highly appropriate, inasmuch as many of its members, like Washington, had left peaceful pursuits to serve their country. (See *CINCINNATUS*.) A number of French officers who had served in the American army, or in the French navy on the American coast, were made honorary life members.

The distinction having been made hereditary, was bitterly attacked as opposed to republican equality, as by Franklin, who saw in it the germ of a future aristocracy. In several states charters were refused to the branch societies, and after an existence of 20 years or more, the societies of Connecticut, Delaware, New Hampshire, Rhode Island, and Virginia were dissolved, leaving the societies of Massachusetts, Maryland, New York, New Jersey, Pennsylvania, and South Carolina. The membership in France was so reduced by the revolution in that country, that no meetings were held after 1792.

The badge of the society is a bald eagle suspended by a dark blue ribbon with white borders, symbolizing the union of France and America. On the breast of the eagle there is a figure of Cincinnati receiving the military ensigns from the senators, with the plow in the background; round the whole are the words: *Omnia reliquit servare rempublicam*. On the reverse, the same hero is represented crowned by fame with a wreath, on which is inscribed: *Virtutis primum*, etc. The vote of the general society determines whether the eldest son or the next in order to the deceased member is worthy of admittance. Where there is no direct male posterity, the right of membership passes to a member of a collateral branch.

At the second general meeting, in 1787, Washington was elected president-general, and was re-elected every third year during his life. His successors in office were Alexander Hamilton and the Pinckneys; and when Lafayette visited this country, in 1824, he was its only surviving maj.-gen. The last survivor of the original association was Robert Burnet, of New York, who died in 1854. The general society, of which Hamilton Fish, of New York, is the presiding officer, meets biennially, but the state societies hold annual meetings.

It has been thought that the society has some political partisan significance or inclination, but this is not the fact. The Tammany society was started to oppose the society of the Cincinnati, because the latter was supposed to be established in the interest of the wealthier and more aristocratic classes. See *North American Review*, Oct. 1853; *Memoirs of the Pennsylvania Historical Society*, vol. VI.

**CINCINNATUS, LUCIUS QUINCTIUS**, a Roman consul, regarded by the later Romans as the model of antique virtue and simple manners. So far as we can discern his char-



acter through the veil of legend, C. appears to have been a violent patrician. About 460 B.C., he was chosen consul, and two years later was made dictator. When the messengers from Rome came to tell C. of his new dignity, they found him plowing on his small farm. He soon rescued the consul Lucius Minucius, who had been defeated and surrounded by the Æqui. Livy's account of the mode in which the deliverance was effected is rejected by Niebuhr, who points out the inconsistencies and impossibilities of the story, and seems disposed to regard the whole as a mere myth. We are next informed that, after a dictatorship of sixteen days, C. returned to his small farm on the Tiber. When 80 years old, he was once more made dictator (439 B.C.), and suppressed a threatened plebeian insurrection.

**CIN'ÆAS**, the chief adviser of Pyrrhus, king of Epirus. His most famous work was in visiting Rome, to arrange for peace, after the defeat of the Romans in 280 B.C. In Rome, he learned in a single day the name of every man of importance in the city. He was not successful in securing peace, and when he returned he told Pyrrhus that Rome was a temple and its senate an assembly of kings.

**CINERA'RIA**, a genus of plants of the natural order *compositæ*, sub-order *corymbifera*, very nearly allied to *senecio* (groundsel, ragwort, etc.), from which it differs only in having the involucre formed of one row of equal erect scales. The species are numerous, and widely diffused over the world in very various climates. They are annual or perennial herbaceous plants; with simple, generally toothed or sinuate leaves. Many of them are remarkable for the ashy appearance of the lower part of the leaves, whence their name (Lat. *cinis*, -*oris*, ashes). The leaves are often covered with a peculiar sort of down.

**CIN'EARY URNS** (Lat. *cinis*, ashes) were used by the nations of antiquity to contain the ashes of the dead when gathered from the funeral pile. Previous to being deposited in the urn, the embers were soaked with wine; the urn was then placed in a niche in the family mausoleum. Only the wealthy could afford so expensive a rite. C. U. were either sculptured in marble, or formed of clay or glass. See BURIAL; CREMATION.

**CINGALESE**, or SINGHALESE. See CEYLON.

**CIN'NA**, LUCIUS CORNELIUS, a Roman noble, was one of the principal supporters of the faction of Marius. After Sulla had driven Marius from the city, and before setting out on his expedition against Mithridates, he allowed C. to be elected to the consulship. But C. had no sooner entered upon that office (87 B.C.), than he impeached Sulla, endeavored to form an interest among the citizens who had been added to Rome after the social war, and agitated for the recall of Marius. The events which led to the return of Marius are stated in the article Marius (q.v.). After a cruel massacre of the Roman citizens, in which some of the most eminent statesmen and orators were slain, Marius and C. declared themselves consuls. On the death of Marius, which occurred within a few days of his usurpation, C. made L. V. Flaccus his colleague for that year, and C. P. Carbo for the two succeeding years. In 84 B.C., he prepared to meet Sulla, who was then on his way from the east to take vengeance upon his enemies, but was slain by his disaffected troops at Brundisium. His daughter Cornelia married Julius Cæsar.

**CIN'NABAR**, an ore of mercury, from which almost all the mercury of commerce is obtained. Chemically, it is a bisulphuret of mercury, containing 86.2 parts of mercury and 13.8 of sulphur. It occurs both crystallized and massive, not unfrequently disseminated. Its crystals are six-sided prisms. It varies from perfectly opaque to almost transparent; has an adamantine almost metallic luster, and a carmine color, with a bright scarlet streak. Its specific gravity is 8 to 8.2. *Hepatic C.*, so called from its liver-brown color, is a variety containing a little carbon. C. sometimes occurs in primitive rocks, but more frequently in those of the coal formation, and is sometimes even intimately mixed with coal itself. It is, however, a rare mineral, and is nowhere found in Britain. The C. mines of New Almaden, California, are the most productive in the world. C. is used as a pigment under the name of *vermilion*.

**CINNAMIC ACID AND THE CINNAMYL SERIES.** Cinnamyl is a compound radical, as yet unisolated, which is represented by the formula  $C_6H_5 \cdot CH : CH \cdot CO \cdot$ , and which includes among its compounds cinnamic acid,  $C_6H_5 \cdot CH : CH \cdot COOH$ , oil of cinnamon, which is chemically a slightly impure aldehyde of cinnamic acid, or a hydride of cinnamyl,  $C_6H_5 \cdot CH : CH \cdot CHO$ , chloride of cinnamyl,  $C_6H_5 \cdot CH : CH \cdot COCl$ , styrene or peruvine, known chemically as cinnamic alcohol,  $C_6H_5 \cdot CH : CH \cdot CH_2 \cdot OH$ , styrol, represented by the formula  $C_6H_5 \cdot CH : CH_2$ , and styracin,  $C_6H_5 \cdot C_6H_4 \cdot O_2$ . We shall briefly notice the most important of these compounds—viz., cinnamic acid and oil of cinnamon. *Cinnamic acid*,  $C_6H_5 \cdot CH : CH \cdot COOH$ , crystallizes in colorless prisms, which are sparingly soluble in cold water, but dissolve readily in boiling water, alcohol, and ether. It fuses at 271.4° F. (133° C.), and boils with or without decomposition, according to the manner in which it is heated, at about 572° F. (300° C.). It is converted by most decomposing agents into benzoyl compounds, such as benzoic acid, oil of bitter almonds, etc.; for example, when fused with hydrate of potash, it assimilates the elements of water, and breaks up into acetic and benzoic acids; when boiled with peroxide of lead, it is converted into oil of bitter almonds and benzoic acid, etc. It exists naturally in a free state in liquid storax, the balsams of Tolu and Peru, and gum benzoin, and is often

deposited in large crystals from old samples of oil of cinnamon and from cinnamon water. It is always formed from oil of cinnamon when the latter is exposed to the action of the air. Cinnamic acid is one of the first steps in the preparation of artificial indigo, and for that purpose it is prepared on a large scale by heating benzalchloride,  $C_6H_5 \cdot CHCl_2$ , and fused sodium acetate,  $CH_3 \cdot COONa$ , together in closed iron vessels. Oil of cinnamon and oil of cassia, although prepared from different kinds of trees, are virtually identical in their composition, each consisting mainly of cinnamic aldehyde, or hydride of cinnamyl, mixed with certain resinous matters.

**CINNAMON** is the spicy, aromatic, and stimulating bark of certain species of the genus *cinnamomum*. This genus belongs to the natural order *lauraceæ*, and was formerly included in *laurus*. It contains a considerable number of species, natives of tropical and subtropical parts of the east. *C.* has been in use from the remotest antiquity. It is mentioned in the Old Testament, and by a name almost the same as that which it still bears in most languages. The finest kind is said to be chiefly produced by *cinnamomum zeylanicum* (formerly, *laurus cinnamomum*), which chiefly grows in the island of Ceylon, although, having been introduced into the West Indies in 1782, along with various other plants of the east, it is now cultivated there to some extent. The tree attains the height of 20 to 30 ft., and is sometimes  $1\frac{1}{2}$  foot in thickness. Its bark is of a grayish-brown color, internally of a yellowish red. The leaves are oval, 4 to 6 in. long, with a blunt point, and marked with three principal nerves. They have the taste of cloves. The flowers are of a silky gray on the outside, and a pale-yellowish color internally. The fruit is somewhat like an acorn in shape; it is a small drupe, brown when ripe. There are two seasons of cinnamon-harvest in Ceylon, the first commencing in April, and the last in Nov.—the former being that in which the chief crop is obtained. The branches of 3 to 5 years' growth being cut down, the epidermis is scraped away; the bark is then ripped up longitudinally with a knife, and gradually loosened, till it can be taken off. The slices are then exposed to the sun, when, as it dries, it curls up into *quills*, the smaller of which are inserted into the larger, and the whole tied up in bundles of about 88 lbs. each. *C.* is examined and arranged according to its quality by persons who are obliged for this purpose to taste and chew it, although in a short time it produces painful effects on their mouths and tongues. The finest *C.* is yielded by the young branches of the tree, especially by the numerous shoots which spring up from the stump after a tree has been cut down, and which are cut when about 10 ft. long, and of the thickness of an ordinary walking-stick. The smell, particularly of the thinnest pieces, is delightfully fragrant, and the taste pungent and aromatic, with a mixture of sweetness and astringency. It is used like other spices by cooks and confectioners, and also in medicine as a tonic, stomachic, and carminative. The average quantity annually imported into London is about 500,000 lbs. Its virtues depend chiefly upon the essential oil which it contains (*oil of cinnamon*). Oil of cassia is very often substituted for this oil, as cassia—which, however, may readily be distinguished by its mucilaginous taste—is for cinnamon. The root of the cinnamon-tree contains camphor. The fruit yields a concrete oil, called *cinnamon suet*, which is highly fragrant, and in Ceylon was formerly made into candles, for the exclusive use of the king.—*Cassia* (q.v.) is the produce of another species of *cinnamomum*.—*C. loureirii*, a native of Cochin China and Japan, is said to yield a bark even superior to that of *C. zeylanicum*. A species of *C.*, ascends to the elevation of 8500 ft. in the Sikkim Himalaya. See *illus.*, *TEA, COFFEE, etc.*, vol. XIV.

The constituents of *C.* are a volatile oil (*oil of C.*), tannin, starch, mucilage, woody-fiber, resin, coloring matter, and an acid. The oil of *C.* is generally prepared in Ceylon by grinding the coarsest pieces of *C.*, soaking them in sea-water for two or three days, and then distilling. Two oils pass over, one lighter, the other heavier than water. Oil of *C.* varies in color from yellow to cherry-red, the yellow variety being considered the best, and is most highly esteemed. *Oil of C. leaf* is prepared from the leaves in Ceylon by a similar process, and is met with in commerce under the name of *clove oil*, which it much resembles in odor. *C. water* is obtained by adding water to *C.*, and distilling a large quantity, or by diffusing the *oil of C.* through water by the aid of sugar or carbonate of magnesia. *Spirit of C.* is procured by acting upon *C.* with spirit of wine and water, and distilling. The medicinal properties of *C.*, and its preparation, are aromatic and carminative, and it is serviceable in cases of nausea and vomiting, and in cases of flatulence and spasmodic states of the stomach and alimentary canal.

**CINNAMON-STONE**, a precious stone, of which the finer specimens are highly esteemed; it is regarded as a variety of garnet (q.v.). Its color varies from hyacinth red to orange yellow; and when pure, it is transparent. It is composed essentially of silica, alumina, and lime. It is found chiefly in Ceylon.

**CINNYRIS.** See *SUN-BIRDS*.

**CINQUÉ CEN'TO** (Ital.), five hundred. A technical, or rather *slang* artistic term, used to designate the style of art which arose in Italy after the year 1500, and which therefore belongs to the 16th c.; i.e., after the fall of all the great schools. It is sensuous in its character, the subjects chosen being usually borrowed from heathen mythology or history.

**CINQUEFOIL**, in botany. See **POTENTILLA**.

**CINQUEFOIL**, a common bearing in heraldry. It is usually depicted with the leaves issuing from a ball as a center point.—C., in architecture, is an ornamental foliation in five compartments, used in the tracery of windows, panelings, and the like. The C. is often represented in a circular form, the spaces between the points or cusps representing the five leaves.

The C. of heraldry and of architecture is not derived from any leaf of five leaflets, but, as its perfect regularity of form indicates, from the flower of the plant called C. (*potentilla*), or other similar flower of five petals or *leaves*. The C. thus closely resembles the rose, with which it would, indeed, be identified, but that a double and not a single rose is chosen for the purposes of heraldry and decorative art.

**CINQUE PORTS** (Fr. five ports). It is said that the five maritime ports of England lying opposite to the coast of France—Sandwich, Dover, Hythe, Romney, and Hastings—were enfranchised in the time of Edward the Confessor. But it was subsequent to the battle of Hastings that the conqueror, in order that he might wield the resources of the seaports with greater vigor, constituted this whole line of coast into a jurisdiction entirely separate from the counties of Kent and Sussex, and erected it into a sort of county palatine, under a warden or guardian, the seat of whose administration was in Dover Castle. The warden, whose office corresponded to that of the ancient count of the Saxon coast (*comes littoris Saxonici*), exercised jurisdiction, civil, military, and naval, uniting in his single person the functions of sheriff, custos rotulorum, lord-lieutenant, and admiral. Privileges equal to those originally bestowed on the C. P. were subsequently extended to the so-called *ancient towns* of Winchelsea and Rye, and most of the municipal towns had subordinate ports and towns attached to them, which were called *members*. In place of the Saxon terms of *aldermen* and *freemen*, those of *jurats* and *barons* were introduced, and the latter term has always been applied to the representatives of the C. P. in parliament. The chief function performed by the C. P. in early times consisted in furnishing such shipping as was required for the purposes of the state, the crown having possessed no permanent navy previous to the reign of Henry VII. In the time of Edward I. they were bound to provide no less than 57 ships, fully equipped and manned at their own cost; though the weight of this heavy burden was somewhat lessened by the provision, that the period of gratuitous service should be limited to 15 days. In consequence of the warlike navy which they were thus compelled to maintain, the C. P. became so confident in their strength, and so insolent and audacious, as not only to undertake piratical expeditions, but even to make war and form confederacies as independent states. Previous to the revolution of 1688, the lord-wardens were in use to nominate the barons, or parliamentary representatives of the C. P.; but in 1689, an act was passed to "declare the right and freedom of election of members to serve in parliament for the cinque ports." The reform bill of 1832 reduced the number of members sent to parliament by the C. P. from 16 to 8, and the municipal reform act has broken up the ancient organization of the ports, and assimilated their internal arrangements to those of other English municipalities. The ancient courts of Stepway, Brotherhood, and Guestling are still occasionally held, but their powers scarcely extend beyond matters of form, such as appointing the barons, who are to exercise an ancient privilege of the ports, which consists in carrying the canopy over the sovereign's head at a coronation. The lord-warden's jurisdiction, in relation to civil suits and proceedings, was abolished by 18 and 19 Vict. c. 48, amended by 20 and 21 Vict. c. 1.

**CINTRA**, a small but picturesquely situated town in Portugal, in the province of Estremadura, about 15 m. w.n.w. of Lisbon, with a pop. of 5000. It stands on the declivity of the Sierra de Cintra, and is surrounded by country residences. There is a palace at C., a strange mixture of Moorish and Christian architecture, anciently occupied by the Moorish kings, and subsequently a favorite residence of the Christian monarchs. A charming view of the town and of the sea is to be had from the top of a hill crowned with the ruins of a Moorish castle. On another hill-top stands La Pena, once a convent, afterwards a residence of the king of Portugal, who restored and gave it the outward appearance of a feudal castle. In the neighborhood, also, is what is called the Cork convent, which derives its name from the cells—which are cut out in the rock—being lined with cork to prevent damp.

C. is historically remarkable for the *convention* concluded here, Aug. 22, 1808, between the English and French, by which the latter agreed to evacuate Portugal. Junot had been defeated by sir Arthur Wellesley at Vimieira, and had retreated towards Torres Vedras and Lisbon, whither the English under sir Hew Dalrymple, who had just arrived and assumed the chief command, were preparing to follow them. But the French, despairing of finally holding out, agreed to evacuate the country, on condition of not being treated as prisoners of war, but landed on the coast of France, retaining their arms and effects. This convention excited the greatest public indignation both in the Peninsula and in England. Several English newspapers appeared in mourning, and the ministry were obliged to have the generals who signed the convention tried by a court-martial, which, however, resulted in their acquittal. In fact, though the terms of the convention might be advantageous for the French, to obtain immediate possession

of Portugal and Lisbon, instead of being put to the necessity of a bloody siege for months, was no less advantageous to the English and their allies. Such, at least, was the opinion of two competent judges—Napoleon and Wellington.

**CIO'NE**, ANDREA DI. See ORCAGNA.

**CIOTAT**, LA, a t. of France, in the department of Bouches-du-Rhone, situated on the w. side of a bay in the Mediterranean, about 15 m. s.e. of Marseilles, in the midst of a district clad with olive, orange, and pomegranate plantations. It is well built and has a good and commodious harbor, formed by a mole, and well defended. The industry consists in cotton-spinning, ship-building, and an active trade in the produce of the district. Population of commune '91, 12,223.

**CIPANGO** (sometimes written *Zipangu*, *Zipangri*, or *Oimpagu*). See MYTHICAL ISLANDS.

**CIPHER**, an ornamental arrangement of the initial letters of a name, by which they become also a private mark, adopted by artists and architects as distinctive of their work. That of Albrecht Dürer is well known.

**CIPHER-WRITING**. See CRYPTOGRAPHY.

**CIPRIANI**, GIAMBATTISTA, painter and copper-engraver, was b. in Florence, 1733, or, according to others, in 1727, and when 19 years old, went to Rome, where he chose Correggio as a model, and soon gained a high reputation. Invited by certain English residents in Rome, the artist came to London about 1754, where he was one of the first members of the Royal Academy (founded 1769) and died in 1785. His drawing is correct, his coloring harmonious, his heads have grace and loveliness, and the general style of his works is attractive, although exceedingly conventional. A series of small copper-plate illustrations of *Orlando Furioso* well exemplifies his graceful style. Several of Bartolozzi's best engravings are in C.'s manner.

**CIRCE' A** (from *Circe*, q.v.), a genus of rather pretty little herbaceous plants of the natural order *Onagraceae*, with a deeply 2-cleft calyx, a corolla of two petals, and two stamens. *C. lutetiana* is frequent in shady situations in Britain, and in most parts of the continent of Europe. It bears the English name of ENCHANTER'S NIGHTSHADE, and in Germany it is called Hexenkraut (witches' herb).

**CIRCAR**, an Indian term applied to the component parts of a province, each of which is administered by a deputy governor. In English, it is principally employed in the name of the Northern Circars, used to designate a now obsolete division of the Madras presidency, which consisted of a narrow slip of territory lying along the w. side of the bay of Bengal, from 15° 40' to 20° 17' north. These Northern Circars were Cicacole, Rajahmundry, Ellore, Condapilly, and Guntoor, in all 80,000 sq. miles.

**CIRCASSIA**, a division of the Western Caucasus, comprising the n., and also a portion of the s. slope of that mountain-range extending in lat. 42° to 45° n., and long. 37° to 47° east. See CAUCASUS.

**CIRCASSIANS**, in the wide sense of the term, is the name given to all the independent tribes of the Caucasus; in a narrower sense, it denotes the tribes who inhabited the western part of the range which is called, in consequence, Circassia. The C. proper, however, occupied only the s.w. wing of the Caucasus, with the exclusion of Abasia, or the portion between the Black sea in the w. and the lower bank of the river Kuban in the north. They call themselves Adighé, but the Russians and Turks call them *Tcherkesses*. On their conquest by Russia in 1864, rather than remain in subjection to that power they chose to emigrate to Turkey, and from 400,000 to 500,000, or nearly the whole nation of 15 tribes, carried this resolution into effect. The greater part of them were distributed over the Turkish possessions in Asia Minor, but others were settled in the mountainous parts of Bulgaria and on the borders of Servia. In their original country they were a marauding and warlike people, amongst whom it was held more honorable to live by plunder than by peaceful industry. In common with all brigand tribes, the C. cherished the most unrestrained love of independence. Their government was a singular compound of constitutionalism and feudalism. There were five distinct ranks in the nation—viz., chiefs or princes, nobles, common freemen, dependants, and slaves. The class of common freemen made up the great mass of the people; they possessed property, and enjoyed the same political rights as the nobles. The fourth class, the dependants, were the vassals of the princes and nobles, whose lands they cultivated, and whose armies they formed. Yet their lord had no right over their persons; for in some cases they and their whole families left him; and they could only be sold as slaves for punishment according to the previous verdict of a national assembly. The fifth class comprised the slaves, or those who had been made captive in war. That the C. have not lost some of the worst traits of their natural character since their settlement in Turkey is shown by their participation in the Bulgarian massacres of 1876 and 1877.

The C. princes and nobles are principally Mohammedans, whilst the great mass of the people have a religion which is a kind of mixture of Christianity and paganism, in which the celebration of Easter, the sign of the cross, sacred trees, sacrifice, and processions with lights, play an important part. Besides agriculture and the raising of cattle, they possess a few other branches of industry. The C. are proverbially handsome;

they are also strong, active, and temperate, and are characterized by the higher attributes of self-dependence, courage, and prudence. As a nation they made their first historical appearance during the middle ages. They are, however, chiefly known through their long struggles to maintain their independence against the aggression of Russia. See CAUCASUS. For their place in ethnology, see CAUCASIAN VARIETY OF MANKIND. For type of people, see *illus.*, ETHNOLOGY, vol. V.

**CIRCE**, a fabulous sorceress, is described by Homer as "fair-haired, a clever goddess, possessing human speech," sister of "all-wise Æetes," daughter of "the Sun, who gives light to mortals, and of Perse, whom Ocean begot as his daughter." Round her palace in Æea were numbers of human beings, whom she had changed into the shapes of wolves and lions by her drugs and incantations. She changed two-and-twenty of the companions of Ulysses into swine, but that hero, having obtained from Mercury the herb *moly*, went boldly to the palace of the sorceress, remained uninjured by her drugs, and induced her to disenchant his comrades. He remained with her for a year; and when he departed, she instructed him how to avoid the dangers which he would encounter on his homeward voyage (*Odyssey*, books x. and xii.). Jealous of Scylla, whose love was sought by Glaucus, she poured the juice of poisonous herbs into that part of the sea where her rival was accustomed to bathe, and changed her into a monster.

**CIRCE II**, a t. of ancient Italy, in Litium, at the foot of Mons Circeus, a short distance from the sea, 10 or 12 m. from Terracina. Its ruins are still visible on the Montedella Cittadella, and consist of walls and gateways, built of polygonal blocks.

**CIRCENSIAN GAMES**. See CIRCUS.

**CIRCLE**, a plane figure bounded by a curved line, which returns into itself, called its *circumference*, and which is everywhere equally distant from a point within it called the *center* of the circle. The circumference is sometimes itself called the C., but this is improper; C. is truly the name given to the space contained within the circumference. Any line drawn through the center, and terminated by the circumference, is a *diameter*. It is obvious that every diameter is bisected in the center. (See ARC, CHORD.) In co-ordinate geometry, the C. ranks as a curve of the second order, and belongs to the class of the conic sections. It is got from the right cone by cutting the cone by a plane perpendicular to its axis. The C. may be described mechanically with a pair of compasses, fixing one foot in the center, and turning the other round to trace out the circumference. The C. and straight line are the two elements of plane geometry, and those constructions only are regarded as being properly geometrical which can be effected by their means. As an element in plane geometry, its properties are well known and investigated in all the text-books. Only a few of the leading properties will here be stated.

1. Of all plane figures, the C. has the greatest area within the same perimeter.

2. The circumference of a C. bears a certain constant ratio to its diameter. This constant ratio, which mathematicians usually denote by the Greek letter  $\pi$ , has been determined to be 3.14159, nearly, so that, if the diameter of a C. is 1 foot, its circumference is 3.14159 feet; if the diameter is 5 ft., the circumference is  $5 \times 3.14159$ ; and, in general, if the diameter is expressed by  $2r$  (twice the radius), then  $c$  (circumference)  $= 2r \times \pi$ . Archimedes, in his book *De Dimensione Circulorum*, first gave a near value to the ratio between the circumference and the diameter, being that of 7 to 22. Various closer approximations in large numbers were afterwards made, as, for instance, the ratio of 1815 to 5702. Vieta, in 1579, showed that if the diameter of a C. be 1000, etc., then the circumference will be greater than 3141.5926535, and less than 3141.5926537. This approximation he made through ascertaining the perimeters of the inscribed and circumscribed polygons of 398,216 sides. By increasing the number of the sides of the polygons, their perimeters are brought more and more nearly into coincidence with the circumference of the circle. The approximation to the value of  $\pi$  has since been carried (by M. de Lagny) to 128 places of figures. It is now settled that  $\pi$  belongs to the class of quantities called *incommensurable* (q.v.), i.e., it cannot be expressed by the ratio of any two whole numbers, however great. In general, it may be considered that 3.14159 is a sufficiently accurate value of  $\pi$ .

Though the value of  $\pi$  was at first approached by actually calculating the perimeter of a polygon of a great number of sides, this operose method was long ago superseded by modes of calculation of a more refined character, which, however, cannot here be explained. Suffice it to say, that various series were formed expressing its value; by taking more and more of the terms of which into account, a closer and closer approach to the value might be obtained. We subjoin one or two of the more curious.

$$\pi = 4 \left( 1 - \frac{1}{8} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} + \text{etc.} \right).$$

$$\pi = 8 \left( \frac{1}{1.8} + \frac{1}{8.5} - \frac{1}{8.5.7} + \frac{1}{5.7.9} - \frac{1}{7.9.11} + \frac{1}{9.11.18} - \text{etc.} \right).$$

3. The area of a C. is equal to  $\pi$  multiplied by the square of the radius ( $=\pi r^2$ ); or to the square of the diameter multiplied by  $\frac{\pi}{4}$ ; i.e., by .7854. Euclid has proved this

by showing that the area is equal to that of a triangle whose base is the circumference, and perpendicular height the radius of the circle.

4. It follows that different circles are to one another as the squares of their radii or diameters, and that their circumferences are as the radii or diameters.

The C. is almost always employed to measure angles, from its obvious convenience for the purpose, which depends on the fact demonstrated in Euclid (book iv. prop. 33), that angles at the center of a C. are proportional to the arcs on which they stand. It follows, from this, that if circles of the same radii be described from the vertices of angles as centers, the arcs intercepted between the lines, including the angles, are always proportional to the angles. The C. thus presents us with the means of comparing angles. It is first necessary, however, to graduate the C. itself; for this purpose its circumference is divided into four equal parts, called *quadrants*, each of which obviously subtends a right angle at the center, and then each quadrant is divided into degrees, and each degree into minutes, and so on. The systems of graduation adopted are various, and will now be explained.

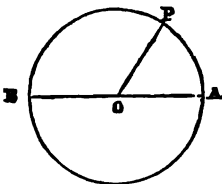
*The sexagesimal scale* is that in common use. According to it, each quadrant or right angle being divided into 90 degrees, each degree is divided into 60 seconds, and each second into 60 thirds, and so on. According to this scale, 90° represents a right angle; 180°, two right angles, or a semicircle; and 360°, four right angles, or the whole circumference—the unit in the scale being the  $\frac{1}{360}$ th of a right angle. As the divisions of the angles at the center, effected by drawing lines from the center to the different points of graduation of the circumference, are obviously independent of the magnitude of the radius, and therefore of the circumference, these divisions of the circumference of the C. may be spoken of as being actually divisions of angles. By laying a graduated C. over an angle, and noticing the number of degrees, etc., lying on the circumference between the lines including the angle, we at once know the magnitude of the angle. Suppose the lines to include between them 3 degrees, 45 minutes, 17 seconds, the angle in this scale would be written 3° 45' 17".

It is obvious, however, that the division of the quadrant into 90 degrees instead of any other number, is quite arbitrary. We may measure angles by the C., however we graduate it. Many French writers, accordingly, have adopted the

*Centesimal Division of the Circle*.—In this division, the right angle is divided into 100 degrees, while each degree is divided into 100 parts, and so on. This is a most convenient division, as it requires no new notation to denote the different parts. Such a quantity as 3° 45' 17" is expressed in this notation by 3.4517, the only mark required being the decimal point to separate the degrees from the parts. Of course, in this illustration, 3° means 3 centesimal divisions of the right angle, and 45' means 45 centesimal minutes, and so on. If we want to translate the quantity 3° of the common notation into the centesimal notation, we must multiply 3 by 100, and divide by 90. To translate minutes in the common notation into the centesimal, the rule is to multiply by 100, and divide by 64.

There remains yet another mode of measuring angles, known as the

*Circular Measure*.—The circular measure of angles is in frequent use, and depends directly on the proposition (Euc. vi. 33), that angles at the center of a C. are proportional to the arcs on which they stand. Let POA be an angle at the center O of a C., the radius of which is  $r$ ; APB a semicircle whose circumference accordingly =  $\pi r$ ; and let the length of the arc AP =  $a$ . Then, by Euclid,  $\frac{\text{angle POA}}{2 \text{ right angles}} = \frac{a}{\pi r}$ ; and



$\angle POA = \frac{2 \text{ right } \angle s}{\pi} \cdot \frac{a}{r}$ . Now, supposing  $a$  and  $r$  to be given,

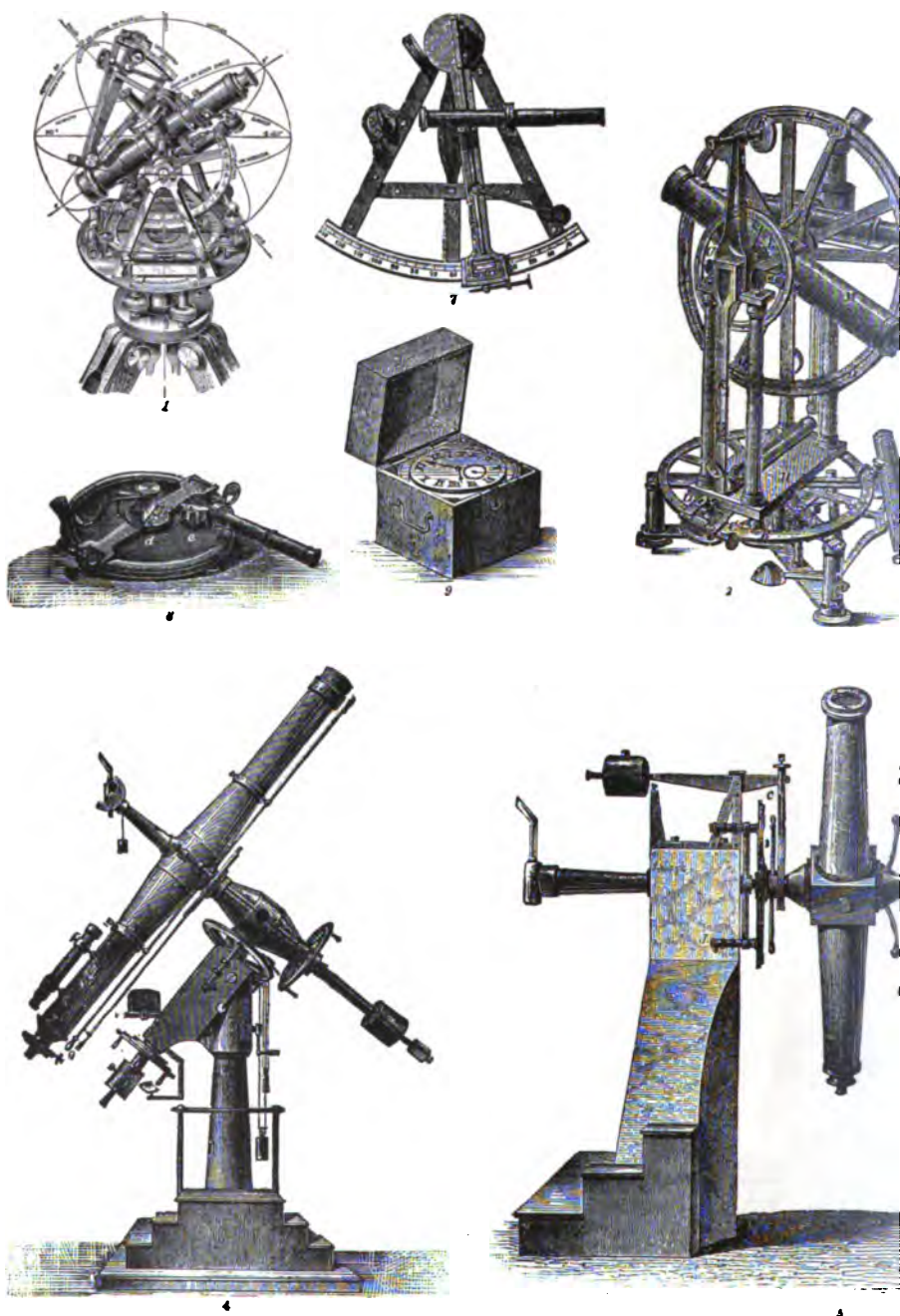
although the angle POA will be determined, yet its numerical value will not be settled unless we make some convention as to what angle we shall call unity. We are free to make any convention we please, and therefore choose such a one as will render the preceding equation the most simple. It is made most simple

if we take  $\frac{2 \text{ right angles}}{\pi} = 1$ . We shall then have (denoting

the numerical value of the angle POA by  $\theta$ )  $\theta = \frac{a}{r}$ . The result of our convention is, that the numerical value of two right angles is  $\pi$ , instead of 180°, as in the method of angular measurement first alluded to; and the unit of angle, instead of being the ninetyeth part of a right angle, is  $\frac{2 \text{ right angles}}{\pi}$ , or 57° 17' 44" 48" nearly. Making  $\theta = 1$  in

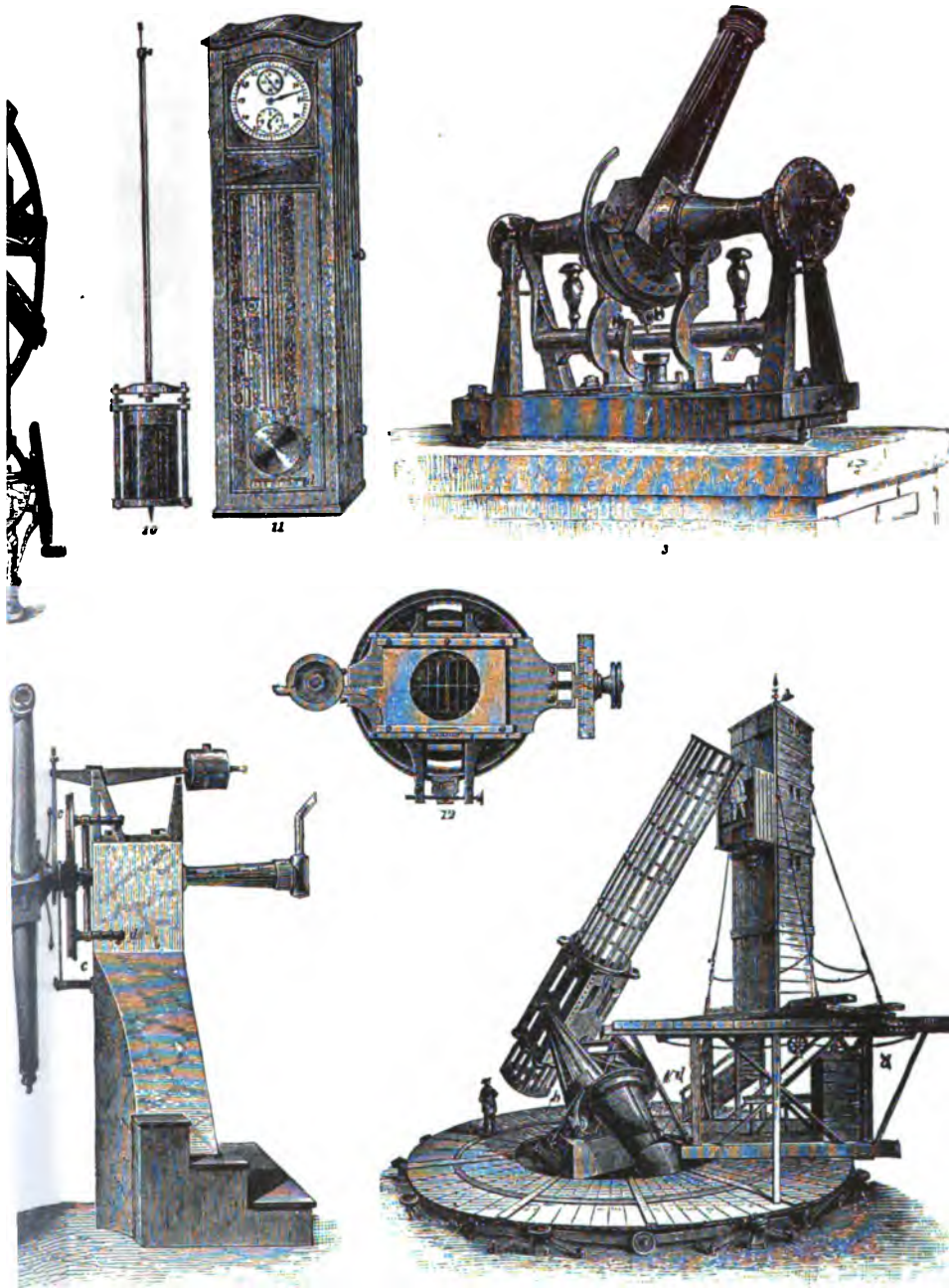
the equation  $\theta = \frac{a}{r}$ , we have  $a$  (or AP) =  $r$  (or AO), which shows that in the circular measure, the unit of angle is that angle which is subtended by an arc of length equal to radius. It is frequently a matter of indifference which mode of measuring angles is adopted; the circular measure, however, is generally the most advantageous, as being the briefest. It is easy to pass from this mode of measurement to the sexagesimal. If





**CIRCLE, MERIDIAN, ETC.—**1. Universal instrument. 2. Transit instrument. 3. Passage instrument. 4. Reflecting circle. 5. Box-chronometer. 6. Pendulum.





1. Pendulum with mercury compensation. 2. Astronomical clock. 3. Micrometer.  
 4. Equatorial. 5. Meridian circle. 6. Lassell's reflecting telescope. 7. Re-  
 flecting instrument.



$\theta$  be the circular measure of an angle, the angle contains  $\frac{\theta}{\pi} \cdot 180^\circ$ ; conversely, if an angle contain  $n^\circ$ , its circular measure is  $\frac{n}{180} \cdot \pi$ .

**CIRCLE, MAGIC**, a space in which sorcerers were wont, according to the ancient popular belief, to protect themselves from the fury of the evil spirits they had raised. This C. was usually formed on a piece of ground about 9 ft. square (in the east, 7 ft. appears to have been considered sufficient), in the midst of some dark forest, church-yard, vault, or other lonely and dismal spot. The C. was described at midnight in certain conditions of the moon and weather. Inside the outer C. was another somewhat less, in the center of which the sorcerer had his seat. The spaces between the circles, as well as between the parallel lines which inclosed the larger one, were filled "with all the holy names of God," and a variety of other characters supposed to be potent against the powers of evil. Without the protection of this C., the magician, it was believed, would have been carried off by the spirits, as he would have been, had he by chance got out of the charmed space.

**CIRCLE, MURAL**, an instrument used for determining the meridian altitude or zenith distance of a star. It consists of an astronomical telescope firmly fixed to a graduated circle, which moves about a horizontal axis, fixed in a strong vertical wall running north and south. In the common focus of the eye-piece and object-glass of the telescope is a system of cross-wires (spider lines are generally used for the purpose), one being horizontal, and five vertical, with equal spaces between. The line joining the optical center of the object-glass with the intersection of the horizontal and middle vertical wires, is called the line of *collimation* of the telescope, and when the instrument is in perfect adjustment, this line moves in the plane of the meridian.

Besides the above-mentioned fixed wire, there is a movable one, called a micrometer wire, which is moved by means of a screw, remaining always parallel to the fixed horizontal wire.

If the instrument be so adjusted that the image of a star, while passing across the middle vertical wire in the field of view, shall at the same time be bisected by the fixed horizontal wire, the star is at that moment in the line of collimation of the telescope. It is therefore at that moment in the meridian, and its meridian zenith distance is the angle through which the circle would have been turned from the position it had when the line of collimation of the telescope pointed to the zenith. There is a fixed pointer, for the purpose of approximately reading the instrument. If the instrument were accurately adjusted, so that the pointer was opposite the zero point of the circle, when the line of collimation of the telescope pointed to the zenith, the arc intercepted between these two positions of the instrument would be the meridian zenith distance of the star.

Great nicety is required in "reading" the instrument; i.e., in determining exactly the arc through which the circle has moved in bringing the telescope from the vertical to any other position. The rim is usually graduated at intervals of five minutes; and the eye could determine only the division nearest to the fixed index. But by means of a "reading microscope," or micrometer (q.v.), fixed opposite to the rim, the portion of the interval to the nearest division on the rim can be read to seconds. There are usually six such microscopes fixed opposite different points of the rim; and the "reading" of the instrument is the mean of the "readings" of all the microscopes. This tends to eliminate errors arising from imperfect graduation and adjustment. If the instrument is properly adjusted, the zero point of the circle will be opposite the fixed pointer when the line of collimation of the telescope points to the zenith. In practice, however, this is not always accurately, or even approximately the case. As we shall immediately show, it is of no consequence, as the final result of every observation is the *difference* between two readings.

It is evident that the difference between any two readings of the instrument will represent the angle through which the line of collimation of the telescope moves in passing from one position to the other. It remains to show how a fixed point, viz., the nadir (q.v.), is observed, and then how an observation is taken of the star itself in its meridian passage.

We must explain here that the fixed horizontal wire in the eye-piece of the telescope, in the instruments as now used, is only an *imaginary* line which determines the line of collimation of the telescope. It coincides with the position of the micrometer wire, when the screw-head of the micrometer marks zero.

To observe the nadir, a trough of mercury is placed underneath the instrument, and the telescope is turned so as to look vertically downwards into it. An image of the system of cross-wires which is in the common focus of the object-glass and eye-piece, will be reflected back again to nearly the same focus. Looking into the telescope, the observer now adjusts it by means of a tangent screw till the reflected image of the horizontal wire coincides with the real one. The final adjustment is perhaps most delicately affected by turning the screw-head of the micrometer which moves the wire itself. When they coincide, the line joining the center of the object-glass of the telescope with

the intersection between the middle vertical and horizontal micrometric wire, will be vertical. Now, the angle between this and the line of collimation of the telescope, which, as we have said, joins the optical center of the object-glass with the intersection of the middle vertical and imaginary fixed horizontal wire, will, if the micrometer is in proper adjustment, be at once read off the micrometer screw-head. The instrument being clamped as above adjusted, the microscopes are read off, and the reading of the micrometer screw-head above mentioned being added to or subtracted from this reading, as the case may be, the nadir reading of the instrument is determined. The zenith reading, therefore, which differs from it by  $180^\circ$ , is at once known.

Again, to observe a star in the meridian, the instrument is previously adjusted so that the star, in passing the meridian, shall pass over the field of view of the telescope. As the image of the star approaches the center of the field, the observer adjusts the telescope by the tangent screw, so as very nearly to bring the image of the star to the horizontal wire. Finally, just as the star passes the middle vertical wire, he bisects the image of the star with the horizontal wire by a touch of the micrometer screw-head. The circle being now clamped (or made fast), the "reading" is determined as before by reading the pointer and microscopes, and adding or subtracting, as the case may be, the reading of the micrometer. This reading now subtracted from the zenith-reading gives the meridian zenith distance of the star; and this, again, subtracted from  $90^\circ$ , gives its meridian altitude above the horizon. See TRANSIT INSTRUMENT.

**CIRCLE, QUADRATURE OF.** See QUADRATURE.

**CIRCLES OF THE SPHERE.** See ARMILLARY SPHERE.

**CIRCLEVILLE**, a city and co. seat of Pickaway co., Ohio, on the Scioto river, the Ohio canal, and the Cincinnati and Muskingum Valley, and the Norfolk and Western railroads; 25 miles s. of Columbus. It was laid out in 1810 on the site of a circular fortification, built by some ancient people, and from which the name is taken. The fort is described in Howe's History of Ohio. The city contains churches, national banks, a high school, and union schools, public library, and daily and weekly newspapers, and has excellent water power, electric lights and electric street railroads. The chief industry is pork-packing; there are also large straw-board works, and great quantities of broom corn are raised in the vicinity. Pop. '90, 6556.

**CIRCUIT.** See ELECTRICITY.

**CIRCUIT COURT**, in American jurisprudence, a court whose jurisdiction extends over a number of counties or districts, and which holds its sittings in various places within the jurisdiction. More definitely, a class of federal courts of which the terms are held in two or more places successively in the various circuits into which the whole union is divided. They are presided over by the chief-justice of the U. S., or one of the associate judges, or by a special circuit justice, or in some cases by a district judge. The C. C. has jurisdiction in law and equity, direct and appellate; hears appeals in admiralty, and in some instances in criminal cases. The systems respecting circuit courts in the several states differ considerably.

**CIRCUITS** (Fr. *circuit*; Lat. *circuitus*, a going round). In ENGLAND.—England and Wales, with the exception of the co. of Middlesex, are divided, for judicial purposes, into eight C., which the 15 judges visit twice or thrice a year, in pairs, for the purpose of adjudging civil and criminal causes. These C. are the Home, the Midland, the Norfolk, the Oxford, the Northern, the Western, the North Wales, and the South Wales. Criminal charges within the co. of Middlesex and the city of London and surrounding district, are disposed of at sessions which are held monthly at the central criminal court. Before and after term, the judges of the superior courts sit for the adjudication of civil causes in the Guildhall of the city of London, with the exception of the lord chancellor and the vice-chancellor, who sit at Lincoln's Inn. "These judges of assize came into use in the room of the ancient justices in eyre, *justiciarii in itinere*, who were regularly established, if not first appointed, by the parliament of Northampton, 1176 A.D., in the twenty-second year of Henry II., with a delegated power from the king's great court, or *aula regia*, being looked upon as members thereof."—Stephen's *Com.*, vol. iii. p. 415. See ASSIZE and NISI PRIUS.—IRELAND is divided into six circuits.

**CIRCULAR NOTES** are bank-notes specially adapted for the use of travelers in foreign countries; and being, in fact, bills personal to the bearer, they are believed to be more safe as traveling money than ordinary notes or coin. C. N. are furnished by the chief London banking-houses. Those who wish to obtain them, determine beforehand what sum of money they will require on their journey, and that they pay to the banker, who, in exchange, gives C. N. to the amount, each of the value of £10 and upwards. Along with these notes is given a "letter of indication." This letter (a lithographed form in French) is addressed to foreign bankers, requesting them to pay the notes presented by the bearer, whom they name, and to aid him in any way in their power. By way of verification, the bearer appends his signature, and the letter is complete. On the back of the letter there is a long list of foreign bankers, extending all over Europe, any of whom will cash one or more of the C. N., on being presented and indorsed by the bearer; the indorsement being of course compared with the signature on the letter of indication, which is at the same time exhibited. In paying these notes, the money

of the country is given, according to the course of exchange, and free of any charge for commission. For security, the letter and the notes should not be carried together, in case of being stolen or lost. These C. N. are doubtless a safe and convenient species of money, exchangeable in almost every town visited; and if any remain over on coming home, they will be taken back at their value by the banker who issued them. There are, however, certain drawbacks connected with these notes, which every traveler less or more experienced. In many, almost in all, instances, there is a difficulty in finding out where the banker named is to be found; for foreign bankers generally occupy obscure apartments several stories high, and not unusually in dingy out-of-the-way alleys. To discover them, a commissionaire may be necessary. Then, in some instances (in Paris invariably), the banker jealously scrutinizes the bearer, asks to see his passport, and takes a note of the hotel at which he lodges; all which may be proper as a precaution against roguery, but it is not pleasant. Further, the C. N. are ordinarily of a thick stiff kind of paper, which does not well fit into a purse or pocket-book. On these several accounts, the careful class of travelers who keep to the main thoroughfares of France, Germany, and Belgium, will find £5 or £10 bank of England notes, and sovereigns or napoleons, a preferable kind of money. See CHEQUE BANK.

**CIRCULAR NUMBERS** are numbers whose powers end on the same figure as they do themselves: such are numbers ending in 0, 1, 5, 6.

**CIRCULAR PARTS**, the name given to a rule in spherical trigonometry, invented by lord Napier. It is to be found in any treatise on that subject.

**CIRCULATING DECIMALS**, decimal fractions in which the same figures or series of figures constantly recur; also called circulatory, recurring, or repeating decimals.

**CIRCULATING LIBRARY**, a collection of books lent out on hire—circulated from hand to hand. The plan of lending books on hire is not new. Chevallier, in his *Origines de l'Imprimerie de Paris* (4to, 1694), mentions that, in 1342, a century before the invention of printing, a law was framed in Paris, to compel stationers to keep books to be lent on hire, for the special benefit of poor students and others. This fact is alluded to as follows, by E. S. Merryweather, in his entertaining work, *Bibliomania in the Middle Ages* (London, 1849): "The reader will be surprised at the idea of a circulating library in the middle ages, but there can be no doubt of the fact, they were established at Paris, Toulouse, Vienna, and other places. These public librarians, too, were obliged to write out regular catalogues of their books, and hang them up in their shops, with the prices affixed, so that the student might know beforehand what he had to pay for reading them." This writer, quoting from Chevallier, gives a list of books so lent out, with the prices for reading them. The books are all of a theological or classical kind. Among them is the Bible, the perusal of which is set down at 10 sous. "This rate of charge," it is added, "was also fixed by the university, and the students borrowing these books were privileged to transcribe them, if they chose; if any of them proved imperfect or faulty, they were denounced by the university, and a fine was imposed upon the bookseller who had lent out the volume." In these arrangements, we see the efforts that were made to procure the use of books before the art of printing had cheapened the cost of literature.

By whom the modern C. L. was projected, there is no record. All that can be given are a few facts on the subject. It is known that Allan Ramsay, author of *The Gentle Shepherd*, who was a bookseller in Edinburgh, established a C. L. in that city about 1725. Fond of dramatic literature, Ramsay appears to have incurred some local obloquy by lending out plays; and his wish to introduce a taste for the drama into Edinburgh may accordingly have suggested the notion of a circulating library. Be this as it may, the library which he began was continued through various hands for above a hundred years. At Ramsay's death in 1758, his library was sold to a Mr. Yair, whose widow carried it on till 1780, when it was bought by Mr. James Sibbald, an ingenious inquirer into Scottish literary antiquities. Sibbald lived some years as a literary man in London, during which period, beginning with 1793, the C. L. was carried on, subject to an agreement by a Mr. Laurie. Sibbald afterwards resumed the direction of the library, which he considerably extended. At his death in 1808, his brother attempted to carry it on; but not being successful in his management, he disposed of it in 1806 to Alexander Mackay, a person of extraordinary energy and perseverance. By the acquisition of various other libraries, Mr. Mackay greatly enlarged the collection, which, under the name of the Edinburgh C. L., he conducted at 154 High street. Here, by long-continued and minute attention to business, Mr. Mackay realized a competency, and he retired from active pursuits in 1831.

There are several circulating libraries in London, claiming to be of old date, but probably not so early as 1725. In a late reprint of an old advertisement, we see "Proposals for erecting a public circulating library in London," under date June 12, 1742. This library was to be established "in some convenient place at or near the royal exchange;" and the subscription was to be a guinea per annum. Two of the present circulating libraries are believed to be descended from this primitive stock. So numerous had circulating libraries become in the early years of the present century, that they absorbed whole editions of novels and romances prepared for the purpose by a London

publishing establishment, designated the Minerva press. The issue of cheap books and periodicals about 1833 (see BOOK-TRADE) seriously damaged the C. L. system; for people now bought instead of borrowing materials for light reading. The vast increase to the reading public in recent times, and the continually augmenting number of new and popular works of a respectable class, have been the means of restoring prosperity to circulating libraries, more especially in London, where some of them are on a surprisingly gigantic scale. To one library, Mudie's, as many as 100,000 new books are said to be added annually, and of kinds very different from those of the old Minerva press school. The method of reading from these libraries consists in paying a sum per annum—usually a subscription of a guinea—for which a number of new books may at all times be procured, and kept for a specified period. When the books are no longer in demand, they are sold at reduced prices.

The method of circulating books among the members of private associations, is noticed under the head BOOK-CLUB; and that of circulating books in rural districts by means of libraries which are shifted from place to place, will be found in the article ITINERATING LIBRARIES.

**CIRCULATING MEDIUM.** See MONEY.







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